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24 JAN. 1923
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SACCOLABIUM LONGIFOLIUM AND SACCOLABIUM WIGHTIANUM.

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[*Reprinted from the "Annals of the Royal Botanic Gardens, Peradeniya," Vol. VII., Part II., May, 1920.*]

Saccolabium longifolium and Saccolabium Wightianum.

BY

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AMONG the species of *Saccolabium* recorded for Ceylon are *S. longifolium* Hk. f. and *S. Wightianum* Hk. f.

Saccolabium longifolium was said by Hooker (Flora Ceylon, IV., 198) to have a flower entirely yellow, barred with red on both surfaces, except the lip, which has a few red dots at the apex. Its leaves are lorate, 15–30 cm. long, and 3·75 cm. broad, and its panicle is 15–20 cm. long, with a long, stout peduncle. Its record for Ceylon rests on C. P. 3492; and Hooker quoted a note by Trimen to the effect that the Ceylon plant in the Peradeniya Gardens exactly resembled Lindley's figure, which was taken from a Chinese specimen that flowered in England. The colours given by Hooker appear to be taken from the Ceylon painting.

Saccolabium longifolium Hk. f. is *Acampe multiflora* Lind., Fol. Orchid. 1, and *Acampe longifolia* Lind., *loc. cit.* Lindley stated that the former, which is the Chinese species, had a yellow lip, and the spur inappendiculate; while the latter, from Burma, had a white lip, and a hairy plate within the spur; but Hooker (*loc. cit.*) stated that in all the specimens he had examined (including Lindley's) there was a hairy plate within the sac descending from the mouth on the opposite side from the column. King and Pantling, in "Orchids of the Sikkim-Himalaya," plate 292, figure *S. longifolium* with a white lip.

Saccolabium Wightianum Hk. f., according to Hooker in Fl. Ceylon, has its sepals and petals pale yellow, sparingly barred or spotted with red, and a white lip with a few transverse red stripes. Its leaves are ligulate, 10–15 cm. long and 3 cm. broad, and the panicle only 2·5–5 cm. long. According to Wight (Icones, t. 1670) the flowers are yellowish dashed with

dark crimson or purplish spots, and the lip nearly white, with a red line at the base of the lamina. In Fl. Brit. India the sac is said to be papillose within, but that detail is omitted in Fl. Ceylon. No mention is made of any plate within the sac.

Hooker suggested that *Saccolabium Wightianum* was possibly not distinct from *S. longifolium*. The distinguishing characters given in the key to the genus *Saccolabium* in Flora Ceylon are " *S. longifolium*, lip yellow," and " *S. Wightianum*, lip white."

Saccolabium Wightianum.

Saccolabium Wightianum was C. P. 2342. The figure shows leaves 16·5–18 cm. long, of uniform breadth (2 cm.), the apex deeply cut into two unequal lobes, and flowers with a white lip. It is said to be rare in Fl. Ceylon, and is recorded only from Jaffna and Hantane. There are only two sheets in Herb. Peradeniya, and some of the leaves on one are only 11 cm. in length, with tips barely incised.

This species is not uncommon at Peradeniya (which lies just below the Hantane range). On the fresh plants the leaves are equal, 11–18 cm. long and 1·5–2·5 cm. broad. The tips are usually deeply incised, but the lobes vary in length, and are equal or unequal on the same plant. The flower is about 1 cm. in diameter. The sepals and petals are yellow, or greenish-yellow, barred and spotted with red. On the sepals the red colouration is usually in dots, arranged more or less in transverse lines ; the petals are more definitely barred. The lip at first is white, with purple transverse bars and sometimes a few dots, in varying numbers. In some cases the lip bears five bars, either complete from side to side, or extending only halfway across, together with two or three scattered dots ; in others the purple colour may be confined to a single dot near the tip. But as the flower ages the lip becomes yellow, and the bars and spots red. At the same time the sepals and petals become more erect, and the transverse barring on them appears more prominent. The lip, under a magnification of eight diameters, appears minutely tuberculate. At its base there is a small group of larger tubercles, and, following this in the mouth of the sac, a triangular, erect, hairy tooth, which

is continued down the sac as a yellow, hairy, slightly elevated ridge. The edge of the lip is irregularly incised or fimbriate. The side lobes of the lip are strongly hairy on their inner surface, and are usually barred with purple on the inner surface, but not on the outer. The apex of the spur is yellow from the first. The inflorescence is crowded on a stout peduncle about 2 cm. long. It has a strong odour of vanilla.

Wight's figure of *S. Wightianum* (Icones, t. 1670) appears to show a tomentose lip, which, as noted by Lindley, bears two transverse subulate processes near the base. It is probable that these are errors of reproduction, the apparent processes being the transverse purple bars, and the tomentose appearance an attempt to represent the tubercular surface of the lip.

For some time I have had *Saccolabium Wightianum* under observation at Peradeniya. In three successive years it has flowered in May-June, not in September, as given in Flora Ceylon. The inflorescence lasts for a long time, one of six or nine flowers persisting for four weeks. The lips begin to turn yellow from the third to the fifth day, but I have never seen an inflorescence which had the lips of all the flowers yellow at the same time. As a rule, the lower flowers have decayed, before the lip of the uppermost has changed colour. For example, two inflorescences, one of nine and the other of six flowers, began to flower on May 27, 1917. On June 4 there were four flowers with white lips in the former and one in the latter, the remaining five in each case being yellow. On June 16 there was still one white-lipped flower in each inflorescence, but the outer flowers had begun to decay. On the same date, May 27, an inflorescence of ten flowers had seven with yellow lips and three with white lips ; the last flower changed colour on June 9, but there were then only three flowers left, the remainder having decayed.

Saccolabium longifolium.

The figure of *Saccolabium longifolium*, C. P. 3492, in Herb. Peradeniya, shows leaves 16–17 cm. long, 3·5 cm. broad, somewhat narrowed towards the tip. The tip is deeply incised, but the lobes are practically equal. On the herbarium specimen

the leaves are 20–26 cm. long, and 2·8–3·3 cm. broad, with the tips barely incised. The peduncle is much longer than that of *S. Wightianum*, and the flowers more scattered; the whole inflorescence on the herbarium specimen is 20 cm. long, with scattered branches from the base upwards, but the one figured is only 15 cm. long, unbranched, with flowers only near the apex. In the inflorescence figured only two lips are evident, and these are yellow; a flower drawn separately has also a yellow lip with four minute red dots at the tip.

The herbarium specimens of *S. longifolium* were collected by Thwaites in 1865 at Kitulgala. I have recently received living plants of the same species from that locality and from Bibile, collected by Mr. H. F. Tomalin, Conservator of Forests.

The first point which strikes one on seeing living examples of these two species is the marked difference in habit. *Saccolabium Wightianum* forms a tangled mass, its stems hanging down and curving upwards at the extremity; while *S. longifolium* produces erect stems up to 30 cm. high.

The second point of difference is the length of the inflorescence. In *S. Wightianum* the inflorescence is short, not more than 5 cm. high, and forms a compact head of flowers; while in *S. longifolium* it is up to 25 cm. high, with scattered branches.

The length of the leaf is variable, and on some plants of *S. longifolium* the leaves do not exceed 15 cm. in length. They are, however, as a rule, broader than in *S. Wightianum*, and the breadth diminishes slightly towards the tip. But the leaf characters are scarcely sufficient to separate the two species.

The flower of *S. longifolium* is usually larger than that of *S. Wightianum*, and may attain a diameter of 18 mm. It is more clearly yellow, not greenish-yellow, but the differences in colour between the two species are slight. The barring and spotting of the sepals, petals, and lip are the same in both, and in both species the lip is at first white and subsequently becomes yellow. The side lobes of the lip are hairy on the inner surface, and there is a small vertical hairy plate or tooth in the mouth of the sac, which is smaller than the corresponding plate in *S. Wightianum*. The base of the spur is yellow from the first.

The only marked difference in colour is on the area surrounding the disc. In *S. longifolium* the disc is bordered by a broad, vivid purple-red zone, and the horns at either corner of the column are red. In *S. Wightianum* there is a narrow red zone at the base of the column, but the edge of the disc is yellow, and the horns at the top of the column are also yellow.

The outstanding difference between the two flowers lies in the upper surface of the lip. In *S. Wightianum* this is tuberculate, but in *S. longifolium* it is tomentose.

The distinguishing differences between the two species, as known in Ceylon, are, therefore, the relative lengths of the inflorescence and the structure of the lip.

S. longifolium has an odour resembling that of the Lily of the Valley.

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Hypocreaceæ Zeylanicæ.

BY

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IN the Fungi of Ceylon Berkeley and Broome enumerated 54 species of *Hypocreaceæ*. Cesati added 5 species from Beccari's collection, and Cooke described several Ceylon species which he found in Berkeley's herbarium. Some of Berkeley and Broome's species of *Nectria* have been redescribed by von Höhnel, who has added new species which were overlooked or misnamed by them, but in general the Ceylon specimens of this family have not been critically re-examined. The present contribution deals more especially with the old Thwaites's specimens, no special collecting in this group having been done. The total number of recorded species is consequently comparatively small, and further collecting may be expected to add to it considerably.

Saccardo's subdivisions of the genus *Nectria* have been adopted, in the absence of any more satisfactory scheme of classification. The division of the genus into stromatic and non-stromatic forms would appear to be inapplicable in the case of tropical species. *Nectria bicolor*, for example, has typically a well-developed stroma, but in some gatherings the perithecia are scattered, without any stroma; and *Nectria flavolanata* may be stromatic or not in the same gathering. It may be noted that conidial stromata, of the type of that of *Nectria cinnabarina*, seem to be rare in Ceylon; in the cases in which the conidial stage is known it is mucedinous, an effused weft of hyphæ and conidiophores. This, again, precludes the adoption of a classification based on the character referred to above, if the term "stroma" is extended to cover any basal weft of hyphæ, for such a stroma may be present or not according to the substratum on which the

fungus is growing. *Nectria hæmatococca*, for example, has no stroma when growing on wood or bark, as a rule ; but when it grows on a cacao pod, it frequently first covers the latter with a layer of mycelium and conidiophores, and the perithecia which subsequently develop would, under the terms postulated, be regarded as stromatic.

Saccardo's subdivisions are, however, unsatisfactory, in that they are not mutually exclusive. A *Nectria* which, according to the structure of its perithecial wall, is *Lepidonectria*, may be seated on a byssoid subiculum, and consequently be *Hyphonectria*. Cooke appears to have had this idea in mind in his classification of the genus *Nectria* in Grevillea, XII., and his subsequent employment of a double generic name, *e.g.*, *Dialonectria* (*Nectriella*) *gigaspora* (Grevillea, XVII., p. 42).

The genus *Ophionectria* Sacc. (=*Tubeufia* Penz. & Sacc.) has been divided by Seaver into *Ophionectria*, containing those species lacking a stroma, and a new genus, *Scoleconectria*, containing those species provided with a stroma. Two species of *Ophionectria* are known to occur in Ceylon, *O. trichospora* B. & Br., and *Ophionectria coccicola* Ell. & Ev. The former is the type species of the genus *Ophionectria*, while the latter is included by Seaver in *Scoleconectria*. The stroma of *Ophionectria coccicola* is a thin byssoid layer, slightly elevated where it grows over a scale insect, but frequently quite plane. *Ophionectria trichospora*, however, has also a thin byssoid stroma, though, as it is not parasitic on scale insects, the stroma is nowhere elevated. Seaver's generic distinction consequently fails.

Throughout the *Hypocreaceæ* Thwaites's specimens were mixed up in a most unaccountable manner. A conceivable solution is that it was the work of a native collector, who put together everything he gathered in a given locality. Thwaites apparently effected a partial separation, but the numbers were still mixtures when they reached Berkeley and Broome, and, in many instances, the type specimens are mixtures still. Therefore, it is necessary to exercise more than ordinary caution in examining these type specimens, for any one of them may contain as many as five species.

It has proved very difficult to discriminate between Berkeley and Broome's Ceylon species of *Hypocrea*, even with the assistance of fresh specimens. Indeed, this genus has given more trouble than any other of the Ceylon fungi whose revision has hitherto been attempted. The colour of the ripe spores provides an excellent primary character, but very many of the specimens are so immature that no spores are present, and where hyaline spores are present in the ascus, it is not possible to be certain that that is their final colour, as the development of colour is usually of late occurrence. Comparison with fresh specimens is rendered difficult by the changes which these species undergo when drying or in the herbarium. Colour, of course, usually fades, or changes to a uniform red-brown, while one character which can be relied upon when the specimens are fresh, viz., whether the stroma is opaque or subtranslucent, has no definite parallel in the dried specimens. Some subtranslucent species dry to a horny consistency when immature, but become opaque and brittle, or even friable, if dried in the mature stage, and the texture of the stroma appears quite different in the two stages. The characters which appear to be the most reliable are (1) the manner of attachment of the stroma, whether over the whole base or only centrally; (2) the position of the perithecia, whether at the same or different depths, and the position of the perithecial layer in the stroma; and (3) the shape of the perithecia, which, though not, as a rule, constant, varies in a definite direction, viz., from globose to laterally oval, or from globose to vertically oval.

The genera *Cordyceps* and *Torrubiella* have been omitted from the present list.

Epichloe pulvinulus B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 981. It was transferred to *Hypocrella* in Saccardo, Syll. Fungorum, II., p. 581. In Ann. Perad., VI., p. 172, it was re-described as *Balansiella pulvinula* (B. & Br.) Petch.

Epichloe cinerea B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 982. In Ann. Myc., IX., p. 394, a fungus from India was described under the same name by Sydow and Butler. It would, however, appear doubtful whether the Indian species is the same as the Ceylon one ; on the available specimens the Ceylon fungus would be referred to *Dothichloe*, but until fresh specimens are available, the question is best left undecided (see Ann. Perad., VI., p. 173).

Hypocrea artocreas B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 983, as "Hemisphærica, late affixa, subtus tomentosa albida, supra plana jecorina rugosiuscula, primum pulverulenta. Apparently on petioles of some palms. Sporidia not mature." Thwaites's number was 110, but in Herb. Peradeniya he mounted his specimens on the same sheet with 42, *Hypocrea palmicola*, and 558, *Hypocrea rufa*. There are, however, apparently four species on this sheet, and it would seem probable that the specimens submitted to Berkeley and Broome were mixed, for they apply the term "hemisphærica" to both *Hypocrea palmicola* and *Hypocrea artocreas*, though it scarcely fits either.

The specimens on decayed palm tissue, which are apparently *Hypocrea artocreas*, are discoid, with vertical sides and usually a flat upper surface, circular, up to 1·5 mm. diameter and 0·3 mm. thick, attached over the whole base, subtranslucent, reddish-brown, pruinose, with a narrow tomentose hypothallus. The perithecia are laterally oval, about 220 μ diameter and 170 μ high, with a yellowish wall. The spores are immature. Nothing matching this has been collected recently.

Hypocrea discella B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 984, as "Pallide rufa, orbicularis, applanata, supra rugosa punctata : sporidiis minoribus. On dead wood. Asci linear ; sporidia 2·5 μ long." The Thwaites's number

cited is "5 in part." This is one of the cases in which Thwaites, or probably his collector, put together several species, which he subsequently separated. The other parts of No. 5 are *Hypocrea catoptron*, 5 in part; *Hypocrea citrina*, 5 in part; *Hypocrea citrina*, 1094 (5 in part); and *Hypocrea multiformis*, 1094, 1095, both of which numbers are "5 in part." Consequently it is to be expected that mixtures of these species will occur in all the types. In addition to the type specimen of *Hypocrea citrina* in Herb. Kew, No. 1093 in the cover of *Hypocrea multiformis* is *Hypocrea discella* and *Hypocrea catoptron*, and 1095 at Peradeniya contains the same two species.

Hypocrea discella from the herbarium specimens is flattened pulvinate, more or less circular or oval, with a lobed margin, up to 1 mm. diameter, thin, upper surface slightly convex. A few specimens are red-brown, uniformly coloured, with a rounded margin, and up to 0·4 mm. thick, but the majority are thinner, with a somewhat flattened margin, red-brown or sordid yellow-brown in the centre, yellow to yellow-brown at the margin. The surface is minutely tomentose or irregular, with minute, pulvinate, perithecial elevations. The ostiola are black and slightly projecting. The internal tissue is yellowish-white, rather loose and friable, and the perithecia separate readily when mounted. The perithecia are broadly flask-shaped, up to 0·2 mm. diameter and 0·2 mm. high, crowded, situated at slightly different depths, and the wall appears black in section, but is yellow by transmitted light. The sporiferous part of the ascus measures 56 × 3 μ. The part spores are globose, 2·5–3 μ diameter, or oval, 3–4 × 2·5–3 μ, greenish-yellow, warted.

Hypocrea deplanata B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 985, as "Cremoricolor, adnata, margine brevi albo byssoideo: ostiolis impressis lectoribus. Sporidia 16, globose, forming a necklace." The type specimen is now brown, with darker ostiola, and the ostiola are slightly elevated.

When fresh this species is pale yellow or straw-coloured with yellow, translucent ostiola, and usually a broad, white, byssoid hypothallus. It is circular, orbicular, or irregularly lobed, up to 3 mm. diameter (exclusive of the hypothallus), thin, 0·2–0·3 mm. thick, pruinose becoming glabrous, with slightly elevated ostiola. The perithecia are subglobose or laterally oval, up to 0·2 mm. diameter and 0·15 mm. high, situated in a brownish-yellow layer, which occupies practically the thickness of the stroma. The tissue beneath the perithecial layer is pale yellowish. The perithecial wall is pale yellow-brown, or almost hyaline. The asci are 52–58 × ·3 μ. The part spores are globose, 3 μ diameter, or oval, 4–5 × 3 μ, spinulose; in the type they are not fully mature, and apparently all are hyaline: in a recent collection some of the asci contain a few mature spores, which are blackish yellow-green.

Hypocrea corticioides B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 986, from Thwaites 645, as "Effusa, olivacea, margine brevi byssoideo: peritheciis nunc immersis, nunc liberis collapsis; sporidiis ellipticis obtusis apiculatis uniseptatis. Sporidia 5–6·25 μ long."

In the type specimen the stromata are effused and flat, circular, up to 5 mm. diameter. Some of them are elevated in the centre, but that is because they are growing over swellings in the bark of the host. The surface is tomentose and the context rather loose. The colour is now somewhat olivaceous, but it would appear probable that the fungus is white when fresh. The perithecia are immersed, and the stroma is studded with red-brown ostiola, which do not project: but part of the loose stroma may weather away, and the perithecia become superficial. The perithecia are about 0·2 mm. diameter. The asci are cylindric, eight-spored, 50 × 4 μ. The spores are oblong-oval, obtuse, one-septate, slightly constricted at the septum, hyaline, becoming pale greenish olivaceous, 5–6 × 2–2·5 μ. It is possible that they may separate into part-spores later.

Hypocrea saccharina B. & C.

This was described by Berkeley in Jour. Linn. Soc., X., p. 376. In Fungi of Ceylon, No. 137, Berkeley and Broome described a var. *sporidiola* "peritheciis magis prominulis: junior pallida. On stems of decayed Agarics. Sporidia immature." The specimens are quite immature, and identification is impossible. No specimens have been collected recently on decayed Agarics.

Hypocrea pezizoides B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 988, from Thwaites 3·3, as "Orbicularis, undulata, aurantiaca, centro affixa. Stratis pallida, carne alba; sporidiis globosis. At first looking like a lichen, or the apothecia of some lichen, more or less margined, then expanded, ¼–½ inch across: sporidia 3·75–3·25 μ diameter."

This species is not uncommon on dead mango branches. The stromata are roughly circular in plan, sometimes irregularly lobed, feebly convex, undulating, up to 2 cm. diameter. They are sessile, but affixed only over a small area in the centre of the base. In small specimens the base is closely applied to the bark of the host plant, but in the larger it may be widely separated, except at the edge and the central point of attachment. The colour is orange-red above, yellowish below, and white internally. The upper surface is slightly white pruinose, and the ostiola are not evident. The stroma is 1–1·5 mm. thick. In large specimens there is often a distinct flat margin, about 0·5 mm. wide, but the stroma is convex from the beginning, not at first closed, or with an incurved margin, as might be inferred from Berkeley and Broome's description. The perithecial cavities are globose, 180–240 μ diameter, crowded in a single layer. The asci are cylindric, eight-, then sixteen-spored, 100–130 × 6–7 μ. The part-spores are oval, 6–8 × 5–6 μ, or globose, 5–6 μ, greenish hyaline, yellow in mass, spinulose.

Hypocrea jecorina B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 989, from Thwaites 33, 1097. Thwaites 1097 was part of his 33, another part being 1096, which was included under *Hypocrea multiformis*.

Berkeley and Broome's description is "Convexa, pulvinata, jecorina, demum subplicata ; ostiolis prominulis ; carne alba. On bark and wood. Sporidia 3·75–5 μ, forming a necklace."

This species is common at Hakgala, and has been collected at Peradeniya. It grows on old decaying Polypori, or more generally on Pyrenomycetæ, *e.g.*, *Nummularia pithodes*. The stromata are usually circular, regular, sometimes lobed, flattened convex, often undulating, margin rounded, up to 1 cm. diameter, 1·5 mm. thick, dark red-brown, becoming livid brown, with slightly projecting black ostiole, glabrous, opaque, usually attached only in the centre. The surface becomes wrinkled in drying. The stroma is fleshy and somewhat fragile when fresh, but compact and rather corky when dry ; internally it is white. The perithecial cavities are flask-shaped, about 200 μ high, 120–150 μ diameter, crowded, with a yellow-brown wall. The asci are 60–75 × 4 μ, cylindric, eight-, then sixteen-spored. The part-spores are spherical, greenish-hyaline, white in mass, minutely warted, 3·5–4 μ diameter.

The conidial stage of this species is a *Trichoderma*, green, with dirty green, subglobose conidia, 2·5–3 μ diameter.

Cesati described from Ceylon, *Hypocrea gelatinosa* var. *umbrina*, and this was re-described by Cooke as *Hypocrea umbrina* in Grevillea, XII., p. 78. The specimen from Cesati in Herb. Kew is *Hypocrea jecorina*.

Hypocrea catoptron B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 990, as "Minor, mellea ; peritheciis nigris, demum perlucentibus. Sporidia 6·25–5 μ."

Hypocrea catoptron is not uncommon at Peradeniya. It is up to 2 mm. diameter, circular, discoid, 0·8 mm. thick, the upper surface usually plane, the sides more or less vertical.

but the upper edge rounded and sometimes crenate, attached over the whole base. It is at first pale yellow, with pale brown ostiola, subtranslucent, fleshy; when the spores are mature it becomes pale green, with dark green ostiola. The perithecia are situated in a single layer, rather deeply sunk, globose, 0·2 mm. diameter, or laterally oval, 0·2 × 0·15 mm., with a cylindrical neck about 0·1 mm. high. The part-spores are globose, 4–6 μ. diameter, or oval or subcylindric, 6–8 × 4–6 μ., blackish-green, strongly verrucose. The asci are 90–100 × 6–7 μ.

The specimens assigned to *Hypocrea compta* in Penzig and Saccardo, Icones Fungorum Javanicorum, Tab. XXXV., 3, appear to be a different species. According to the figure and description they are not discoid, and the part-spores are all globose.

In some specimens from Hakgala the upper surface of the stroma is strongly tuberculate. These are white, then pale yellow with green ostiola, and finally olive green. The part-spores are blackish-green, strongly verrucose, globose, 4–6 μ. diameter, or oval or cuboid, 5–6 × 4 μ.

Hypocrea rufa Fr.

This was recorded for Ceylon by Berkeley and Broome in Fungi of Ceylon, No. 991. They gave the spores as 5 μ. diameter. The stromata of the Ceylon species are flattened pulvinate, convex or almost plane above, up to 3 mm. diameter and 0·7 mm. thick, usually circular, but sometimes irregular by confluence, with a rounded margin. They are attached over the whole base, except for a narrow marginal zone. When fresh, they are subtranslucent, honey-coloured, with darker ostiola; when dry, they are dark red-brown, wrinkled. Young specimens, when dry, show a white or yellowish, tomentose marginal zone, *i.e.*, the outer edge of the stroma, not a hypothallus. The perithecia are situated in a peripheral zone, 0·2 mm. deep, and are crowded, sometimes globose 0·2 mm. diameter, but usually vertically oval, 0·2 mm. high, 0·15 mm. diameter, often distorted. The wall of the perithecium is yellow-brown. The spores are hyaline, minutely

warted, globose, 4 μ diameter. Berkeley and Broome's specimen is not quite mature, and has spores globose, 4 μ diameter, or cuboid, 4 × 4·5 μ.

This differs from *Hypocrea rufa* in nearly all respects. I propose to name it *Hypocrea confusa*.

Hypocrea fusigera B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 993, from Thwaites 44, as "Effusa, tuberculata, pallida, tomentosa, ostiolis fulvis ; ascis lanceolatis, sporidiis fusiformibus uniseptatis. On leaves of some Monocotyledon. Peradeniya, November, 1867. Sporidia 75 μ long. This species approaches *Nectria*. Perithecia sometimes immersed, sometimes prominent."

Specimens have been collected recently on dead stems of *Amomum*. The stromata are effused, pulvinate, tuberculate, irregularly oval, up to 7 mm. long, and 4 mm. broad, or confluent in large patches, often with small outlying stromata, which contain only one loculus, cream-coloured or pinkish-white, somewhat pellucid, with scattered, fuscous ostiola ; margin sometimes tomentose, usually glabrous ; ostiola not projecting. When dry, they become more flattened and more strongly tuberculate, and pale reddish-ochraceous. The perithecia are globose or ovoid, 0·25–0·3 mm. broad, 0·3–0·4 mm. high, rather distant. The asci are clavate, apex rounded, 170–180 × 20 μ, eight-spored, with spores at first obliquely uniseriate, afterwards irregularly fasciculate. The spores are hyaline, fusoid, ends obtuse, one-septate, slightly constricted at the septum, not separating into two, straight or slightly curved, 72–110 × 11–13 μ. Short linear paraphyses, about 30 μ long, are present.

Berkeley and Broome's spore measurement is 75 μ. In Saccardo it is said to be 7·5 μ.

Hypocrea palmicola B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 994, but it is published there as *Hypocrea palmicola* B. & C. There does not appear to have been any previous publication of the species, and "B. & C." is no doubt

an error. The brief description is "Hemisphærica, luride rufa; sporidiis globosis 16 (No. 42). On leaves of palms, November, 1867." As noted under *Hypocrea artocreas*, Thwaites united *Hypocrea palmicola* and *Hypocrea artocreas* with *Hypocrea rufa*, and his specimens submitted to Berkeley and Broome may have been mixed. The only species in these three which could be called "hemisphærica" is that attributed to *Hypocrea rufa*.

The specimens in Herb. Kew and Herb. Peradeniya are all immature. They are discoid, circular, up to 2 mm. diameter, with the upper surface plane and minutely wrinkled, and the sides sloping backwards to the base, so that the basal area of attachment is regularly circular, and slightly narrower than the top. The upper edge is acute. The stromata are about 0·75 mm. thick. Some of them are now dark brown, others almost black.

The mature form of this species was sent to Berkeley and Broome as Thwaites 1008, and was assigned by them to *Hypocrea lenta* Fr. But *Hypocrea lenta* has hyaline spores, while the present species has green spores. Berkeley and Broome's specimen of *Hypocrea lenta* from Ceylon has green spores.

The stromata are circular, up to 3 mm. diameter, and 1 mm. thick, with the upper surface plane or slightly convex, and the upper edge usually acute, contracted below to a broad circular base. Specimens from Peradeniya (1,600 ft.) are usually flat-topped, those from Hakgala (5,600 ft.) tend to be more convex and have a less acute edge. The colour is dull green, with blackish ostiola, becoming blackish-olive, and black when dry. Internally the stromata are fleshy, and pinkish or pale flesh-coloured when fresh, becoming blackish when dry. The surface is plane, but becomes rugose on drying. The perithecia are crowded, globose, 160 μ diameter, or ovoid, 160 μ diameter and 200 μ high. The asci are 70–85 × 4–5 μ. The part-spores are vivid green or dark green, olive in old herbarium specimens, spherical, 3–4 μ diameter, or oval, 5–6 × 3–4 μ, spinulose.

This species sometimes grows on other fungi. I have collections on *Stereum lobatum* and on *Poria Ravenalæ*. It has a green *Trichoderma* stage.

Hypocrea multiformis B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 995, as " Pulvinata, umbrinella, ostiolis punctiformibus ; peritheciis immersis vel prominulis ; sporidiis moniliformibus. Sporidia 3·75 μ diameter. There are slight differences in the specimens ; but the fruit agrees in all." They cited Thwaites 1094, 1095, 1096, 33 in part:

Nos. 1094 and 1095 were part of Thwaites 5. Berkeley and Broome cited 5, 1094 in part, for their *Hypocrea citrina* var., and 5 in part for *Hypocrea albofulva* B. & Br., *Hypocrea discella* B. & Br., and *Hypocrea catoptron* B. & Br.

In Herb. Kew and Herb. Peradeniya, Thwaites 1094 appears to be all *Hypocrea citrina* var. and *Hypocrea albofulva*. Similarly, in both herbaria, Thwaites 1095 is *Hypocrea discella* and *Hypocrea catoptron*, some of the latter very immature.

No. 1096 was part of Thwaites 33, another part being No. 1097, *Hypocrea jecorina*. The specimens in 1096 are not quite mature, but they appear to be the species described here as *Hypocrea mellea*.

The only species in this collection which has prominent perithecia is *Hypocrea discella*. It may be that there is another species in Thwaites 1094 in Herb. Kew or Herb. British Museum, to which the name *Hypocrea multiformis* might be applied, but in view of the mixture cited by Berkeley and Broome, it would seem preferable to discard the name.

Hypocrea albofulva B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 996, from Thwaites 5 in part. Their description is " Subtus sub-byssoidea, supra pallida, peritheciis fulvis notata : sporidiis globosa. On twigs, Nuwara Eliya. Sporidia 5 μ in diameter."

The stromata in the herbarium specimens are effused, flat, very thin, irregularly oval or circular, up to 3 mm. long, 2 mm. broad, and 0·2 mm. thick, pale yellow-brown with black ostiola, surface tomentose, with a white byssoid margin, and sometimes interrupted by white byssoid patches. The perithecia are laterally oval, about 0·15 mm. diameter and

0·1 mm. high, with a pale yellow-brown wall. The asci are cylindric, eight-, then sixteen-spored, the sporiferous part measuring about 48 × 3·5–4 μ. The part-spores are hyaline, coarsely warted, globose, 3·5–4 μ diameter, or oval, 4 × 3 μ.

Hypocrea citrina Fr.

This was enumerated for Ceylon by Berkeley and Broome in Fungi of Ceylon, No. 997, from Thwaites 1094, which was part of Thwaites 5. There is no Ceylon specimen in the cover of *Hypocrea citrina* in Herb. Kew, but in the cover of *Hypocrea multiformis* there are specimens, part of Thwaites 1094, marked *Hypocrea citrina* var. Most of them are immature. The following description is drawn up from fresh specimens :—

Stromata flattened pulvinate, even, circular, up to 3 mm. diameter, 0·7 mm. thick, margin rounded, attached over nearly the whole base, straw-coloured, with inconspicuous brown ostiola, glabrous, not translucent, becoming minutely wrinkled on drying ; internally white, surface layer distinctly yellow in section, perithecial walls pale yellow. Perithecia globose, about 0·15 mm. diameter, crowded. Asci, sporiferous part, about 70 × 4 μ. Part-spores hyaline, rather strongly warted, globose, 4 μ diameter, or oval, 4 × 3 μ. I propose to name this species *Hypocrea straminea*.

Hypocrea discoidea B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 998. In Michelia, I., p. 322, Saccardo transferred it to *Hypocrella*. A list of synonyms was given in a preliminary paper on *The Genera Hypocrella and Aschersonia*, in Ann. Perad., V., p. 526, and it is hoped to publish a full account of these genera shortly.

Hypocrea Bambusæ B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 999. In Michelia, I., p. 323, it was transferred to *Hypocrella*. In Ann. Perad., VI., p. 170, the writer re-described it as *Balansia Bambusæ* (B. & Br.) Petch. It is not identical with *Hypocrella axillaris* Cooke (= *Balansia axillaris* (Cooke) Petch), as stated by Massee.

Hypomyces pæonius B & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 1000, and was re-described in Ann. Perad., V., p. 284.

Hypomyces chrysostomus B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 1001, and was re-described in Ann. Perad., V., p. 284.

Hypomyces chromaticus B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 1002, and was re-described in Ann. Perad., V., p. 284.

Hypomyces stilbiger B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 1003. It was transferred to a new genus, *Byssostilbe*, in Ann. Perad., V., p. 292.

Megalonectria pseudotrichia (Schw.) Speg.

This species was recorded by Berkeley and Broome in Fungi of Ceylon, No. 1004, from Thwaites 28 and 48, under the name *Sphærostilbe pseudotrichia* Schw. Part of the same Thwaites's gatherings were left by Berkeley in his herbarium under the name of *Nectria fenestrata*, and the latter name was subsequently published by Cooke. Other specimens from Thwaites 48 were recorded by Berkeley and Broome in Fungi of Ceylon, No. 1009, as *Nectria coccinea* Fr. All these are *Megalonectria pseudotrichia*.

This species is very common in Ceylon. The perithecia frequently occur apart from the conidiophores, either without any conidiophores, or with the two stages on different areas of the same stem.

Sphærostilbe repens B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 1005. It was re-described in Circulars and Agricultural Journal of the Royal Botanic Gardens, Peradeniya, V., No. 8.

Sphærostilbe variabilis B. & Br.

Sphærostilbe variabilis was described by Berkeley and Broome in Fungi of Ceylon, No. 1006, from Thwaites 645, as "Effusa, carnea, quandoque tenuis, quandoque placentæformis; peritheciis liberis collapsis vel eminentibus; ascis linearibus; sporidiis ellipticis utrinque leviter apiculatis uniseptatis. Accompanied by strap-shaped bodies of the same colour, which occasionally bear a head of conidia: sporidia 12·5–15 μ long, 7·5 μ wide. Some of the specimens resemble an *Hypocrea;* but these have the same conidiiferous processes."

The same Thwaites number provided also *Hypocrea corticioides.*

The specimens in the cover of *Sphærostilbe variabilis* in Herb. Kew are from Cooke's herbarium. One is mounted on a sheet, and another is contained in an envelope, which is marked *corticioides.* The remainder of Thwaites 645 is included in the cover of *Hypocrea corticioides*, but the specimens there contain both species.

Sphærostilbe variabilis, in its conidial stage, forms irregularly pulvinate stromata, up to 10 × 5 mm. These are white or pinkish, and tomentose, and bear numerous, erect, stilboid processes. The stalks of these *Stilbum* conidiophores are up to 0·75 mm. high, terete, 0·2 mm. diameter, or flattened, up to 0·4 mm. broad, pinkish-white; the head is ovoid, globose or capitate, reddish orange. Sometimes the heads of all the conidiophores on a stroma fuse into a confluent mass of spores. The conidia are oblong-oval, hyaline, 3–6 × 1·5 μ.

The perithecial stromata are in some cases flat, effused, and tomentose, and bear scattered semi-immersed perithecia. In others they are pulvinate and densely covered with perithecia, and the latter are sometimes immersed. The perithecia are globose, conical above, 0·4 mm. diameter, with a broad ostiolum, semi-translucent. The asci are cylindric, eight-spored, scarcely pedicellate; when immature the spores are obliquely uniseriate, and the asci measure 75 × 5 μ, but when mature the spores are uniseriate, and the asci 105–110 × 6 μ. The spores are narrow-oval, hyaline, sometimes subapiculate, one-septate, strongly verrucose, 9–14 × 5–6 μ.

Sphærostilbe gracilipes Tul.

This species was recorded for Ceylon by Berkeley and Broome in Fungi of Ceylon, No. 1210, from Thwaites 27.

The specimen in Herb. Peradeniya bears *Stilbum* conidiophores, either scattered or fasciculate. They are black, becoming gray or ochraceous at the apex, up to 3 mm. high. The stalk is up to 0·2 mm. broad, and irregularly flattened, twisted, and sometimes longitudinally ridged. The head is subtranslucent, narrow-ovoid, and bears hyaline, narrow-oval spores, 4–5 × 2 μ.

With these are perithecia, either scattered, or in rows in cracks in the substratum. The perithecia are superficial, black, minutely rugose, globose, 0·3 mm. diameter, with a cylindric, or conico-cylindric, ostiolum, 0·2 mm. high and 0·15 mm. diameter. The wall of the perithecium is leathery, not carbonaceous, parenchymatous, the outer layers purple-brown and the inner hyaline. The asci are clavate, with a very long tapering pedicel, thick-walled at the apex, eight-spored, spores biseriate, 200 × 30 μ. The spores are elliptic, thick-walled, hyaline, continuous, 22–30 × 14–15 μ.

It is evident that this is not *Sphærostilbe gracilipes*. It would appear to be a *Ceratostomella*, though the ostiolum is somewhat short.

Probably the same species was collected by Beccari in Ceylon, and was described by Cesati as *Sphærostilbe incerta*. His description is "Perithecia libera, globosa, fuscella ; ascis cylindraceis octosporis, sporidiis oblongis, 10–12 × 5, obtusis, endochromate granuloso, non septatis. Conidiophora rigida, fuliginea, subulata, capitulum ochraceum sphæricum gerentia, conidiis minutis, ellipsoideis, hyalinis, vix 1·5 longis constans." As Cesati's unit was 2 μ, this gives 20–24 × 10 μ for the ascospores, and 3 μ for the conidia.

There is no specimen of *Sphærostilbe incerta* Ces. in Herb. Kew, and I have not seen the type. But Thwaites 27 may be known as *Ceratostomella incerta*, whether it is identical with Cesati's species or not.

Nectria monilifera B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 1007, as "Peritheciis ovatis coccineis ostiolo fusco; ascis linearibus; sporidiis globosis leviter granulatis (No. 1105). Apparently on soil, or very rotten wood stained with soil. Peradeniya. Sporidia 37·5–5 μ diameter, forming a necklace." The first of these measurements is evidently an error for 3·75 μ. In Saccardo, II., 448, it was entered as *Nectriella*, while von Höhnel (Mitt. XIV., p. 28) has re-described it as *Neoskofitzia monilifera*. It has also been re-described in Ann. Perad., V., 336.

The fungus in the type specimen grew on sandy soil, not on wood. Recent examples have been found on old termite combs, and it is probable that the latter form its usual habitat. The perithecia are superficial, scattered or clustered, at first red, then dirty brown, 150–400 μ diameter. The asci are cylindric, about 50 × 4–6 μ, eight-spored, with uniseptate spores 7 × 3·5 μ, which separate into globose, rough, olive-green, or yellow-green, part-spores, 3–3·5 μ. The wall of the perithecium in old examples appears pruinose; immature specimens bear numerous hairs, up to 50 μ long, 8 μ diameter two- to four-septate, strongly constricted at the septa. The sixteen part-spores in the ascus are uniseriate, or biseriate, the latter due to an obliquely uniseriate arrangement of the original eight spores.

This appears to be identical with *Neoskofitzia termitum* v. H., though von Höhnel considers the two species distinct.

Nectria flavolanata B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 1008, as "Peritheciis primum villo flavo lanatis, e floccis erectis apice granulatis, conidiophoris; ascis clavatis; sporidiis uniseptatis (Nos. 239 b, 1103). On bark. Central Province. The flocci of the indumentum are of two kinds: the one slender, clavate, inarticulate, bearing oblong, sometimes uniseptate, conidia 7·5 μ long; others are thicker and articulated, with clavate granulated apices and a ring of granules, some oblong, triseptate, 25 μ long, others fusiform,

62·5 μ long, besides which there are sometimes round curved hairs ; sporidia 12·5–15 μ long, 6·25 μ wide."

Under *Nectria flavolanata* in Herb. Kew are Thwaites 1103 (239 in part) marked by Thwaites, "apparently No. 1102 infected with a yellow mould," and another sheet marked "239 *Nectria fulvo-lanata* B. & Br. *Hypoxylon quisquiliarum* Mont." The *Nectria* in the latter case is *N. flavolanata*. In explanation of these data it must be noted that Thwaites put together several gatherings under the number 239, and subsequently separated them. 239*b*, which was *N. flavolanata*, then became 1103, while 239*a*, which was *Hypoxylon quisquiliarum*, became 1072. The specimen in Herb. Peradeniya is marked 1103 (239 part) "apparently 1102 infected with a mould." The Peradeniya specimen is the same as that at Kew.

In the type specimen the perithecia are scattered, or aggregated in clusters up to 2 mm. diameter. They are ovoid, 0·3 mm. diameter, 0·4 mm. high, ostiolum slightly papillate, sometimes collapsing when dry, rather pale red, darker round the ostiolum, covered with minute yellow flocci, densely below, more sparsely above. In the Peradeniya specimen the yellow, or greenish-yellow, mycelium sometimes spreads over the surrounding bark. The hairs are yellow, flexuose, usually short, up to 90 μ long, 4–8 μ diameter, septate, sometimes inflated at the tips, minutely spinulose, often encrusted, often arising from the perithecium wall in tufts. There are also shorter, stouter, more rigid, recurved hairs. The wall of the perithecium is composed of thick-walled polygonal cells about 10 μ broad, and appears areolated when mounted ; it sometimes bears a few minute warts. Round the ostiolum the cells are tangentially elongated. When mounted, the wall sometimes appears yellow, sometimes red-brown. The asci are eight-spored, with spores usually biseriate, clavate, shortly pedicellate, 50–70 × 8–10 μ. A few strap-shaped paraphyses are present, but they do not appear to be septate. The spores are narrow-oval to oblong-oval, sometimes slightly fusoid, one-septate, not constricted, wall striate, hyaline, 15–17 × 5–7 μ, exceptionally 13 × 6 μ, or 16 × 9 μ. I do not find the conidia described by Berkeley and Broome ; obviously some of them are *Fusarium* spores.

In Fragmente zur Mykologie, Mitt. XIV., p. 31 (368), von Höhnel records for Ceylon *Nectria flocculenta*, which he found in the type specimen of *Nectria stenospora* B. & Br. in Herb. Kew, and suggests that it is identical with *Nectria flavolanata* B. & Br. The specimens in Herb. Kew in the type of *N. stenospora* which are marked *N. flocculenta* by von Höhnel are identical in perithecial wall and hairs with *N. flavolanata*, but their spores are oval, thin-walled, 9–10 × 3–5 μ. Elsewhere, von Höhnel gives 9–10 × 3–4 μ for the spores of *N. luteopilosa* Zimm., which he regards as identical with *N. flocculenta* v. H.

It would appear from the above that *Nectria flocculenta* differs from *Nectria flavolanata* in its smaller spores, but recent gatherings tend to show that the more correct interpretation is that the spores are subject to considerable variation in size. In No. 2151 in Herb. Peradeniya the perithecia are those of *N. flavolanata*, though the hairs are poorly developed, but the spores are thin-walled, obscurely striate, 10–13 × 3–3·5 μ. In another gathering, No. 4279, in Herb. Peradeniya, the perithecia have a well-developed covering of hairs agreeing exactly with *N. flavolanata*, but while one slide shows oval, striate spores, 13–17 × 6–8 μ, another shows thin-walled, narrow-oval, or oblong-oval, spores, 10–13 × 3–3·5 μ. These smaller, thin-walled spores appear to be quite mature.

It may be noted that the measurements of these thin-walled spores agree with those given by Zimmermann for the conidial (*Leptotrichum*) stage of *N. luteopilosa*. In the present case, however, they are undoubtedly ascospores.

Forms of *Nectria flavolanata*, in which the indumentum is poorly developed, are of frequent occurrence. In some of these a few short hyphæ of the typical character are present; in others there is only a yellow incrustation on the wall of the perithecium.

Nectria coccinea Fr.

This was recorded for Ceylon by Berkeley and Broome in Fungi of Ceylon, No. 1009, from Thwaites 48. Both in Herb. Kew and Herb. Peradeniya the specimens are *Megalonectria pseudotricha* (Schw.) Speg.

It has already been noted that Thwaites 48 also provided *Sphærostilbe pseudotrichia* Schw., Fungi of Ceylon, No. 1004, while Cooke described from it *Nectria fenestrata* " Berk. & Curt." in Grevillea, XII., p. 81. The latter species is also *Megalonectria pseudotrichia* (*cf.* Ann. Perad., VI., p. 172).

Nectria bactridioides B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 1010, from Thwaites 58. The description is " Cæspitosa, minutissima ; peritheciis ovatis in pulvinulo sitis ; sporidiis metulæformibus uniseptatis. Looks like a *Bactridium ;* perithecia scarcely visible without a lens ; sporidia 12·5 × 6·25 μ."

The type specimens are in Herb. Kew, and there are also specimens in Herb. Peradeniya. In Herb. Peradeniya the specimen is marked " 58 and 537 (666 part)," and there is also another unnamed specimen marked " 666 p." No. 537 was not cited by Berkeley and Broome ; it is chiefly a *Hymenula*, with some immature stromata, which may be immature *N. bactridioides*, while the specimen " 666 p." is also *Hymenula*.

The stromata are pulvinate, up to 2 mm. diameter and 1·5 mm. high, fleshy, reddish-orange in fresh specimens, minutely rough. The perithecia are crowded, superficial, or slightly immersed, flask-shaped, 0·2–0·25 mm. high and 0·18 mm. diameter, smooth, subtranslucent. The asci are cylindric, very shortly pedicellate, 60–70 × 8 μ, eight-spored, with uniseriate spores. The spores are ellipsoid, with rounded ends, not constricted, hyaline, becoming pale yellow-brown, very minutely warted. In the type the spores measure 8–12 × 4–5 μ ; in a recent gathering (No. 4352 in Herb. Peradeniya) they are 11–13 × 6–7 μ.

Nectria stenospora B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 1011, as " Cæspitosa, e matrice alba oriunda ; peritheciis minutis pellucido-coccineis collapsis ; sporidiis angustis uniseptatis. On soft decaying stems. South of the Island, July, 1868. Sporidia 10–12·5 μ long, 2·5–3·75 μ wide."

The specimen was part of Thwaites 647, a number which provided *Nectria stenospora*, *Nectria trichospora*, *Nectria sanguinea*, *Nectria bicolor*, *Nectria Bambusæ*, and *Nectria pityrodes* var. *saccharina*. Consequently, as the specimens of Ceylon Nectrias were very imperfectly sorted out, it is to be expected that the parts of Thwaites 647 under the different names will be mixtures of several species. von Höhnel, on an examination of the type of *Nectria stenospora* in Herb. Kew, found that it contained five species, viz., *Nectria stenospora*, *Nectria bicolor*, *Nectria luteococcinea* (= *N. hæmatococca* B. & Br.), *Calonectria sulcata* (= *Calonectria rigidiuscula* B. & Br.), and *Nectria flocculenta* (= *Nectria flavolanata* B. & Br.). Unfortunately, though von Höhnel marked the position of the last four species on the herbarium sheet, he did not indicate which specimens he took to be *Nectria stenospora*, and there do not appear to be any specimens of the latter now remaining.

According to von Höhnel (Mitt. XIV., p. 31), *Nectria stenospora* occurs very sparingly in the type specimen. The perithecia are situated in small groups on a feebly developed, erumpent stroma, and are cinnabar-red, globose, not collapsing, smooth, 250 to 280 μ broad, with a small, flat, ostiolar papilla. The cells of the perithecial wall are 8–10 μ broad, irregular and thick-walled. The asci are clavate, eight-spored, with biseriate spores, 50–60 × 9–10 μ. The spores are straight, elongated-elliptic, with obtuse ends, not constricted at the septum, hyaline, with four or five longitudinal striæ, 10–14 × 4–5 μ.

It will be noted that von Höhnel's description differs in several points from that of Berkeley and Broome. The latter described their species as arising from a white matrix, and having translucent collapsing perithecia, with narrow spores. It would consequently seem doubtful whether von Höhnel's re-description really refers to Berkeley and Broome's species; it would appear to refer to smooth examples of *Nectria flavolanata*.

In Circulars of the Royal Botanic Gardens, Peradeniya, Vol. V., No. 13, p. 147, the writer recorded *Nectria stenospora* on cacao pods in Ceylon. The spores in these specimens were narrow-oval, or often oblongo-fusoid with straight sides; the

former measured 8–13 × 4–5 μ, while the latter, from the same perithecium, were 11–13 × 2–2·5 μ. A further examination of these specimens, and a comparison with a number of others, in connection with the present revision, has convinced me that these are only nearly bald specimens of *Nectria flavolanata*. The typical hairs can be found in many cases near the base of the perithecia.

It would seem probable, in view of the foregoing, that Berkeley and Broome examined a nearly smooth specimen of *Nectria flavolanata* for their spore measurement of *Nectria stenospora*. These are the only spores I have seen in a Ceylon Nectria which would warrant the name *stenospora*.

There is, however, another species *ex* Thwaites 647, which has claims to be considered *Nectria stenospora*. It occurs in the cover of *Nectria bicolor* in Herb. Kew, and again, evidently part of the same collection, in the cover of *Nectria sanguinea*. The latter specimen is marked Ceylon, but is not numbered. In Herb. Peradeniya it is included in the sheet, Thwaites 647.

The perithecia of this last species may occur singly, in which case they appear superficial, but they are usually densely congregated on an erumpent stroma, in pulvinate masses up to 5 mm. diameter. The perithecia are at first bright red, but when old they become dark red. They are subtranslucent, and smooth, without warts or hairs. The stroma is parenchymatous, with small thick-walled cells, or somewhat sclerotioid. It is paler than the perithecia, being orange red above, and yellow internally, sometimes almost hyaline at the base. When some of the perithecia have been broken away, the specimen appears bicolored, the perithecia showing dark red, and the surface of the stroma orange red.

When young, the perithecia collapse laterally. The older specimens apparently do not collapse. In most of the Kew specimens the perithecia are collapsed laterally if perfect, but many have been broken, and only the lower part is left as a cup. In Herb. Peradeniya one part of the specimen shows fully mature, unbroken perithecia. The immature perithecia appear conoid ; the mature perithecia are ovoid or suburceolate,

with a broadly conical ostiolum, which is often darker than the rest of the perithecium, with a minute ochraceous apex; they are 0·15–0·25 mm. in diameter, and slightly more in height. The wall of the perithecium in section is yellow internally and red towards the exterior; it is composed of thick-walled cells, about 8 μ broad, the outer layer being somewhat amorphous. The asci are narrow-clavate, sessile, with obliquely uniseriate spores, 50–65 × 6–9 μ; sometimes the spores are almost transverse, and the asci 11 μ broad. Linear paraphyses are present. The spores are oval, obtuse, hyaline, not constricted at the septum, 10–13 × 4–7 μ.

The above species appears to me to correspond best with Berkeley and Broome's description. It is cæspitose, with a stroma, which, though not white, is paler than the perithecia, and perithecia, which are for the most part collapsed. It is parasitic on *Sphæriaceæ*.

Nectria villigera B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 1012, from Thwaites 156. Their description is "Conglomerata: peritheciis ovatis rugosis pallidis; floccis conidiiferis conidiis longiseptatis magnis ellipticis vel obovatis. Apparently on some decaying fungus. Surface of perithecia rough."

No specimen of this has been found in the Kew, British Museum, or Péradeniya Herbaria, and the description is too brief to be of any service.

Nectria volutella B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 1013, Thwaites's numbers 445 and 448 being cited. The description is "Carneo-pallida, ostiolo obscuriore, setis pallidis ornata; sporidiis fusiformibus, uno latere ventricosis, biseptatis. On leaves of *Atalantia monophylla* on a lichenoid hispid white crust. Looks at first sight just like a *Volutella:* sporidia 37·5 μ long."

Thwaites 445 and 448 are two entirely different things. 445 bears brown circular patches, which become gray in the

centre, each composed of minute, circular, or oval, close-set depressed spots, with a raised margin, which bear clustered or scattered pycnidia (?). These presumed pycnidia are subepidermal, erumpent, globose, or sub-conoid, 110–140 μ diameter, 80–110 μ high, thick-walled. Apparently they are all immature, and nothing resembling them has been collected recently.

Thwaites 448 bears the *Nectria*. In Herb. Kew the specimen has by some confusion of numbers been labelled 445, but its duplicates are correctly numbered 448. In addition to the *Nectria*, the specimens bear a discomycetous fructification (? of a lichen); consequently part of Thwaites 448 was included in Ceylon Lichens as No. 339, but it was apparently not named by Leighton.

Nectria volutella is parasitic on a *Meliola*, which is covered by its hyaline mycelium, thus forming the lichenoid white crust noted by Berkeley and Broome. The perithecia are scattered, depressed-globose, 0·25 mm. diameter, cream-coloured, pruinose, naked in the upper third, but bearing spreading, rigid, hyaline hairs, up to 0·2 mm. long, in the lower two-thirds. The hairs are thick-walled, about 5 μ diameter, septate, tapering to the apex. The asci are clavate, thick-walled, shortly pedicellate, 160 × 20 μ, eight-spored, spores biseriate. The spores are hyaline, narrow-oval or lanceolate, three to five septate, 32–36 × 7–8 μ.

This species was transferred to *Calonectria* by Saccardo, in Michelia, I., p. 309. Cooke listed it as *Lasionectria* in Grevillea, XII., p. 112, and noted that the spores were two to five septate.

Nectria trichospora B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 1014, as "Perithecis ovatis elongatis asperis coccineis; ascis clavatis, sporidiis fusiformibus longissimis multiseptatis. Sporidia 225 μ long." It was said to be Thwaites 29, and 647 in part; as in other cases, 647 is part of Thwaites 29. The specimen in Herb. Peradeniya is marked 1104 (29 part); it contains *N. trichospora* and *Nectria hæmatococca*.

Saccardo in Michelia, I., p. 323, made this the type species of the genus *Ophionectria*. It was re-described in Ann. Perad., V., p. 285. The perithecia are scattered or clustered on a thin, radiating, red-brown or whitish, byssoid stroma; they are blood red, ovoid, 0·4 mm. high, 0·25 mm. diameter, apex subtruncate, rugose; ostiolum minute, scarcely evident. Asci 200–250 × 20–25 μ, cylindric, eight-spored. Spores 180–240 × 6–8 μ, multiseptate, not constricted, vermiform, either of uniform diameter, or tapering somewhat to either end.

As previously pointed out, this falls in the genus *Tubeufia* Penz. and Sacc., which consequently is superfluous.

Nectria Bambusæ B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 1015, as "Sparsa, pallide aurantiaco-rubra, conica acuta, glaberima; ascis brevibus clavatis; sporidiis minimis. On Bamboo. Sporidia 10 μ long." Thwaites's numbers 29, 64, and 647 in part were cited, but this is subject to the correction that 647 was part of 29. In Saccardo, II., p. 450, it was placed in *Nectriella*.

The perithecia in the type are superficial, scattered or clustered, orange red to blood red, subtranslucent, conoid, shining, slightly darker round the ostiolum, 0·15 mm. diameter, 0·2 mm. high. A fine, white, cobwebby mycelium spreads over the substratum and the perithecia, but it is doubtful whether this belongs to the *Nectria*. The wall is composed of small, thick-walled cells, and bears a few small processes, about 5 μ high and 4 μ diameter. The asci are clavate, generally long-pedicelled, 50–65 × 6–8 μ, with obliquely biseriate spores, and furnished with linear paraphyses. The spores are narrow-oval, thin-walled, strongly two-guttulate, 8–10 × 3–3·5 μ. Most of them are immature, but some are clearly one-septate.

von Höhnel (Mitt. XIV., p. 354) transferred this species to *Pseudonectria* (*Pseudonectria* Seaver = *Nectriella* Sacc., non Fck.), but from the type specimen it is a *Nectria*.

Nectria Peziza Fr.

This was recorded for Ceylon by Berkeley and Broome in Fungi of Ceylon, No. 1016, from Thwaites 29.

There is no Ceylon specimen in the cover of *Nectria Peziza* in Herb. Kew, but in the cover of *Nectria hæmatococca* there is a specimen No. 29 marked "*Nectria Peziza*," with "*hæmatococca*" written by Berkeley above the specific name. The specimens are *Nectria hæmatococca* B. & Br.

Nectria sanguinea Fr.

This was recorded for Ceylon by Berkeley and Broome in Fungi of Ceylon, No. 1017, Thwaites's numbers 647 and 29 in part being cited. The citation is incorrect in suggesting that two of Thwaites's gatherings were referred to this species, as 647 was part of Thwaites 29.

In Herb. Kew there is a Ceylon gathering containing five pieces marked Thwaites 29, "*N. sanguinea, cinnabarina.*" It contains *Nectria striatospora* Zimm. and *Nectria hæmatococca.*

There is also another unnumbered Ceylon specimen in Herb. Kew, labelled *N. sanguinea*, which differs from both the above, and is the species here assumed to be *Nectria stenospora.*

Cesati also recorded *Nectria sanguinea* Fr. for Ceylon with a query, his specimens being imperfect. They were collected by Beccari.

Nectria hæmatococca B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 1018, as "Minuta, conferta, rugosa, coccinea, dein irregulariter vel cupulari collapsa ; sporidiis uniseptatis (No. 1104, No. 29 in part). Sporidia 12·5–15 μ."

In the type specimen in Herb. Kew the perithecia are superficial, without any stroma, but surrounded by the remains of the hyphæ of the *Fusarium* stage, scattered, or gregarious in large patches, blood red, subtransiucent, covered with yellowish-red, loose-looking warts, conoid, 0·2–0·25 mm. diameter. When mounted the wall appears pale yellow, and composed of large cells. The warts are up to 100 μ diameter

at the base, and built up of two or three layers of polygonal cells up to 40 μ diameter, or they may be reduced to single cells projecting from the perithecial wall. The asci are clavate, shortly pedicellate, 55–70 × 12 μ, eight-spored, with spores obliquely uniseriate, or uniseriate below and biseriate above, There are no true paraphyses. The spores are, in general, narrow-oval or oblong-oval, ends obtuse, not constricted at the septum, hyaline, becoming pale brownish, 12–16 × 6–7 μ. A few spores have more rounded ends, and are constricted at the septum.

In the type of *Nectria stenospora* in Herb. Kew von Höhnel found specimens of a *Nectria* which he assigned to *Nectria luteococcinea* v. H. These specimens are identical with *Nectria hæmatococca* B. & Br. They have exactly the same warts, and their spores measure 12–15 × 6–7 μ. Accepting von Höhnel's determination, *Nectria luteococcinea* is identical with *Nectria hæmatococca*.

In Fungi of Ceylon, No. 1016, Berkeley and Broome recorded *Nectria Peziza* Fr. (No. 29 in part). There is no Ceylon specimen in the cover of *Nectria Peziza* in Herb. Kew, but in the cover of *Nectria hæmatococca* there is No. 29, marked "*Nectria Peziza*," with "*hæmatococca*" written by Berkeley above the specific name. These specimens are *Nectria hæmatococca*. There are also Ceylon specimens of *N. hæmatococca* in the cover of *Nectria sanguinea* in Herb. Kew.

In Annals Peradeniya, III., p. 4, the writer described *Nectria diversispora* Petch from dead stems of *Hevea* and Tea. This species has exactly the same perithecia as *N. hæmatococca*, but its spores are slightly smaller, and frequently differ considerably in shape. In some gatherings they measure 9–12 × 4–5 μ. and are oval, often constricted at the septum, sometimes with one cell larger than the other, and with one or both ends broadly rounded. In others they are broader, seldom constricted, 9–10 × 5–6 μ. Another gathering has spores 9–13 × 5–6 μ, broadly oval, not constricted. The asci are usually about 50 × 8 μ, the measurement given in the description being an error. These gatherings grade up so closely to *Nectria hæmatococca* that it is not possible to maintain the two species distinct.

Nectria hæmatococca is one of the commonest of Ceylon Nectrias, and occurs in abundance on dead *Hevea brasiliensis*, tea, &c. Rutgers has described, from dead *Hevea brasiliensis*, *Nectria cancri*, which agrees in many points with the smaller-spored forms of *N. hæmatococca*. Rutgers does not mention the warts on the perithecium in his description, but he shows them in his figure. He gives the asci as 90 × 6 μ, and the ascospores as 10–13 × 3–5 μ, distinctly constricted. The shape of the spores matches that of the spores of the Ceylon form previously named *Nectria diversispora*. Rutger's measurements are from specimens grown in pure culture.

In a paper entitled "The Fusariums from cankered cacao bark, and *Nectria cancri* nova species" (Ann. Jard. Bot. Buitenzorg, Ser. 2, XII., pp. 59–64), Rutgers distinguishes two species of *Fusarium*, one of which he identifies with *Fusarium* (*Spicaria*) *colorans* de Jonge, and the other with *Fusarium theobromæ* Appel and Strunk. In culture, *Fusarium theobromæ* produced perithecia, which were named by Rutgers *Nectria cancri*. It has previously been pointed out that the two Fusariums on cankered cacao bark are those of *Nectria diversispora* and *Calonectria rigidiuscula* (*C. cremea* Zimm.), and that the *Fusarium* which produces the red colour in cultures (*Fusarium colorans*) is that of the latter species (Circulars, Royal Botanic Gardens, Peradeniya, V., No. 13).

Nectria coffeicola Zimm., from the description and figures, appears to be also *Nectria hæmatococca*.

Nectria fuliginosa B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 1019, from Thwaites 146, as "Conferta: peritheciis fuligineis varie collapsis lævibus; sporidiis metulæformibus uniseptatis. Sporidia 15–17·5 μ long."

In the cotype in Herb. Peradeniya the perithecia are scattered, or in small pulvinate groups on a feebly developed, erumpent stroma, globose, about 0·2 mm. diameter, collapsing irregularly, now black or brownish-black, pruinose. The wall is composed of rather small cells, and is blackish-brown when mounted; it bears small warts, sometimes conical and up to 40 μ high, and projecting cells, which are sometimes

one-septate. The spores are elliptic to subfusoid, not, or slightly, constricted, hyaline, then brown, strongly verrucose, the warts sometimes arranged in longitudinal rows, 8–13 × 4–6 μ, exceptionally 14 × 7 μ. The asci are clavate, sessile, eight-spored, spores obliquely uniseriate, 70 × 6–8 μ.

Cooke (Grevillea, XII., p. 110) transferred this species to *Cosmospora*, as a subgenus of *Dialonectria*.

Nectria suffulta B. & C.

This species was originally described by Berkeley from Cuba in Jour. Linn. Soc., X., p. 378. Subsequently it was recorded for Ceylon in Fungi of Ceylon, No. 1020, from Thwaites 1106, 1107. Von Höhnel, who has examined a Kew specimen, states, in Mitt., XIV., p. 36, that the specimen from Ceylon is quite different from that from Cuba. In an earlier publication, von Höhnel and Weese (Ann. Myc., VIII., p. 466) stated that *Nectria leucotricha* Penz. and Sacc. is identical with *Nectria suffulta* B. & Br., 1873; but the latter is probably an error for B. & C.

In Herb. Peradeniya Thwaites 1107 contains two species. One of these is *Nectriella gigaspora* Cooke and Massee. The other is in bad condition, but appears to be the same as the species in Thwaites 1106. Its spores are broadly oval, thick-walled, 10–12 × 5–6 μ, and often almost transverse in the ascus.

Thwaites 1106 in Herb. Peradeniya contains six pieces; two of these do not now bear anything recognizable; the other four bear the species which was regarded by Berkeley and Broome as *Nectria suffulta*.

The perithecia are about 0·25 mm. diameter, superficial, with sparse, white, radiating hyphæ extending from the lower part of the perithecium to the substratum. They are scattered, or in small groups, or lines, of three or four, and in the latter case they appear confluent. The wall is rather thick, collapsing, pruinose, dark red, translucent. The basal hyphæ are simple, rather thick-walled, smooth, and 3–4 μ diameter. The asci are sessile, broadly clavate, about 36 × 9–11 μ, with obliquely uniseriate spores. The spores are oval, ends obtuse, not, or slightly, constricted at the septum, rather thick-walled when mature, 9–13 × 4–6 μ.

In recent gatherings of this species, the perithecia are about 0·35 mm. diameter, with a pruinose wall, and are furnished at first with white, conical, erect fascicles of hyphæ, up to 100 μ high, scattered over the surface. These processes are deciduous, and none can be found on the old herbarium specimens at Peradeniya. The perithecia are brownish-red and subtranslucent at first, but become ochraceous and opaque when old. The perithecial wall has an inner layer of large cells, which, in general, is obscured by a small-celled pruinose layer, but in some gatherings the outer layer is only feebly developed. The basal hyphæ are usually weakly developed, and in some examples barely evident. The spores measure 10–12 × 5 μ, and are not thick-walled.

As this species does not appear to have been named, it may be known as *Nectria confluens*. *Nectria leucotricha* Penz. and Sacc. has spores, 16–20 × 4–5 μ.

Nectria pulcherrima B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 1021, as "Cæspitosa ; peritheciis lentis furfuraceis coccineis ostiolo papillæformi ; sporidiis biseriatis fusiformibus quadrinucleatis." The type specimen was Thwaites 1102, which was another part of the miscellaneous gathering Thwaites 29. In Herb. Peradeniya, Thwaites 1102 contains *Nectria pulcherrima* and *Nectria striatospora* Zimm.

The perithecia are usually clustered on an erumpent stroma, in pulvinate groups up to 3 mm. diameter. A rhizomorphic mycelium, similar to that of *Sphærostilbe repens*, but thinner, permeates the bark of the host plant in thin strands or sheets. The perithecia are globose, 0·5 mm. diameter, with a conical ostiolum ; at first they appear orange red, the wall being red, or brownish-red, thickly covered with irregular, yellow, pulvinate masses, with the ostiolum darker, but when old they become dark red and almost glabrous. The amount of the yellow covering varies ; in the type specimen the perithecia are thickly encrusted, but in the cotype in Herb. Peradeniya the perithecia are darker, and sometimes merely pruinose.

The wall is red-brown when mounted, stout, but composed of rather small cells The yellow covering consists of somewhat loosely built warts, composed of large, very thick-walled cells.

The asci are narrow-clavate, eight-spored, with obliquely uniseriate spores, 110 × 9–10 μ. The spores are oval, ends obtuse, one-septate, scarcely constricted, somewhat attenuated towards one end, wall striate, 24–28 × 8–9 μ in the type specimen.

Berkeley and Broome described the spores as quadrinucleate, and hence it is listed in Saccardo as *Calonectria*. Cooke (Grevillea, XII., p. 107) included it in *Lepidonectria*. This is a common species on Leguminous trees in Ceylon, and frequently parasitic. I have never observed other than one-septate spores. The asci are sometimes four-spored, and the spores most generally 17–25 × 8–9 μ. In a collection from Hapugastenna, No. 2936, the wall is yellow when mounted, the asci 55–65 × 8–10 μ, and the spores 12–18 × 5–6 μ.

Nectria cinnabarina Fr.

This species was recorded for Ceylon by Berkeley and Broome in Fungi of Ceylon, No. 1022, from Thwaites 1102 in part.

The specimen in Herb. Kew is apparently that referred to under *Nectria sanguinea*. It is marked 29 and labelled "*N. sanguinea, cinnabarina.*" The corresponding specimen in Herb. Peradeniya is marked 1102 (29 part), and contains *Nectria striatospora* Zimm. and *Nectria pulcherrima* B. & Br. Thus, the number 29 on the Kew specimen is due to the fact that Thwaites 29 was a composite collection which he subsequently divided, one of the parts being then numbered 1102.

Cesati recorded *Nectria cinnabarina* for Ceylon, from specimens collected by Beccari on Pidurutalagala. He added the note: "De *N. pytirode* Montg. suspicatus sum, quæ autem ascos clavatos 4-sporos gerit, sporidiaque magis cymbiformia." These specimens have not been re-examined.

Nectria bicolor B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 1023, as " Cæspitosa, pallide coccinea vel ochracea, lævis ; sporidiis minoribus oblongo-ellipiticis uniseptatis. Sporidia 8·75 μ long, 2·5 μ broad." The type is Thwaites 647 in part. The co-type in Herb. Peradeniya is marked 647 (29 part), and is on the same sheet as *N. Bambusæ* and *N. stenospora*.

The perithecia are conoid, 0·2 mm. diameter, apex acute, minutely pruinose ; when immature they are reddish-brown and somewhat translucent, but when mature they are pale ochraceous and opaque. In the type they are seated in groups on a horny-looking stroma, which sometimes extends beyond them. The asci are clavate, eight-spored, with spores biseriate above, about 40 × 8 μ. The spores are narrow-oval to subfusoid, one-septate, not constricted, minutely rough, ends rounded, sometimes acuminate, usually 9–12 × 3–4 μ, sometimes 10–14 × 4–5 μ.

In a recent gathering, which developed on the cut cross section of a *Hevea* log, the perithecia are scattered or crowded, without any evident stroma (3067 in Herb. Peradeniya).

Nectria rigidiuscula B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 1024, as " Cæspitosa ; peritheciis ovatis pallide coccineis vix collabentibus ; sporidiis submetulæformibus quadrinucleatis, demum 3-septatis. Allied to *N. ochraceo-pallida*, but of a very different colour and appearance. Sporidia 25 μ long." The type specimen was Thwaites 173 c. In Saccardo this species was listed as *Calonectria*. The type specimen is not in Herb. Kew, but in Herb. British Museum, from Broome's herbarium. Examination shows that it is identical with the later *Calonectria sulcata* Starb. and *Calonectria Meliæ* Zimm. von Höhnel has recorded Ceylon specimens from the type of *Nectria stenospora* B. & Br.

This is one of the commonest Ceylon Nectrias, and occurs in abundance on dead cacao, *Hevea*, &c., with *Nectria hæmatococca*. The perithecia are scattered or crowded, amber to

pale yellowish-white, subglobose, 0·25 mm. diameter, covered with large, more or less compact, rounded warts. In the type the asci are clavate, shortly pedicellate, inflated at the base, four-spored, 80 × 14 μ, with linear paraphyses. The spores are hyaline, oblong-oval or subcymbiform, ends rounded, three-septate, not constricted, 24-28 × 8–9 μ.

The perithecia are sometimes superficial, sometimes on linear stromata emerging through cracks in the bark. In No. 3015 in Herb. Peradeniya, the asci are 90–100 × 9–11 μ, four-spored, with spores 19–28 × 7–11 μ, the shorter spores usually the broader, *e.g.*, 19–23 × 10 μ, and 21–28 × 7–8 μ. In another collection the asci are four-spored, with spores 24–30 × 9–10 μ, three-septate, with occasionally four-septate spores, 29–31 × 9 μ. Specimens developed in culture had asci 85–110 × 8–12 μ, four-spored, with spores 19–29 × 8–10 μ.

This species is probably identical with *Calonectria flavida* Mass., recorded on Cacao from the West Indies, but apparently not described. Its *Fusarium* stage appears to be the same as *Spicaria colorans* de Jonge. It has already been recorded as *Calonectria rigidiuscula* B. & Br. in Ann. Perad., VI., p. 172.

Nectria byssicola B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 1025, as "Cæspitosa, pallide aurantiaca, e strato tenui byssoideo oriunda; peritheciis furfuraceis collabentibus; sporidiis angustis uniseptatis. Sporidia 12·5 μ long, 3–4 μ wide." It was part of Thwaites 173. The specimen in Herb. Peradeniya contains *Nectria byssicola*, *Nectria confusa*, *N. subquaternata*, *Megalonectria pseudotrichia*, and *N. dealbata*.

The perithecia are globose, 0·4 mm. diameter, brownish-red, pruinose, subtranslucent, scattered, or clustered in pulvinate groups, on a thin, indefinite, whitish film of mycelium. The wall of the perithecium is composed of small cells, and bears small rounded warts of small, or collapsed, cells, about 50 μ in diameter and 30 μ high. When mounted the wall appears yellow. The asci are narrow-oval, scarcely pedicellate,

64–80 × 12–14 μ, eight-spored, with spores biseriate, or uniseriate below and biseriate above. The spores are oval, not constricted, one-septate, hyaline, with a striate wall, ends rounded, 13–18 × 6–7 μ.

Nectria subquaternata B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 1026, as "Subcæspitosa ; peritheciis pallide opacis ; sporidiis oblongis submetulæformibus uniseptatis. Often four or five together with a depression in the centre ; sporidia 12 μ long." The specimen was Thwaites 173 *a*. In Herb. Peradeniya this species is mixed with *Nectria byssicola* and others. According to von Höhnel, the Kew specimen contains *Calonectria Meliæ* Zimm. (= *Calonectria rigidiuscula*), *Nectria subquaternata*, and an unnamed species which he has described as *Nectria confusa*.

Nectria subquaternata has perithecia, 0·25 mm. diameter, subglobose, with a minute conical ostiolum, pale flesh-coloured, thickly covered with large, compact, pallid or yellowish-white warts. They are usually densely crowded on a fleshy stroma about 3 mm. long and broad, but sometimes are scattered and superficial. The asci are narrow-clavate, sessile, 50–60 × 6–10 μ, eight-spored, with usually obliquely uniseriate spores, and furnished with linear paraphyses, slightly inflated at the tip. The spores are narrow-oval to oblong-oval, with rounded ends, hyaline, one-septate, not constricted, 10–13 × 4–5 μ.

According to von Höhnel (Mitt. XIV., p. 34) this species is identical with *Nectria squamuligera* Sacc., 1875, *Nectria granuligera* Starb., 1892, and *Nectria subsquamuligera* Henn. & Nym., 1899.

As pointed out by von Höhnel (*loc. cit.*), Berkeley and Broome's statement that the perithecia are in groups of four or five, with a depression in the centre, does not refer to *Nectria subquaternata*, but to one of the other species included with it, viz., *Nectria confusa* v. H.

Nectria pityrodes Mont.

Berkeley and Broome recorded this species for Ceylon in Fungi of Ceylon, No. 1027. They cited Thwaites 173 *b*, as *Nectria pityrodes*, and Thwaites 29 (in part) as var. *saccharina*, adding the note : " Resembling a pale form of *N. cinnabarina*, but with longer different-shaped sporidia. Cæspitose, pale orange, furfuraceous, at length collapsed, ostiolum dimpled, sporidia cymbiform, uniseptate, 25–40 μ long." There does not appear to have been more than one collection.

von Höhnel, who has examined the type specimen, states that it is quite different from *Nectria pityrodes* Mont., and has described it as *Nectria Berkeleyi* (Mitt. XIV., p. 17).

The perithecia are globose, about 0·4 mm. diameter, orange yellow, subtranslucent, in small pulvinate groups on an erumpent stroma. The wall is densely covered with large, rough, loose-looking warts. The asci are clavate, sessile, eight-spored, about 90 × 20 μ. The spores are subcymbiform, flat, or slightly concave, on one side, not constricted at the septum, with rounded ends, 24–30 × 9–12 μ.

Nectria aurantiicola B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 1028, on a scale insect on orange. von Höhnel has transferred it to *Corallomyces* (Mitt. XIV., No. 729). It is a *Sphærostilbe*, and will stand as *Sphærostilbe aurantiicola* (B. & Br.). An account of the *Nectriæ* parasitic on scale insects is in course of preparation.

Nectria dealbata B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 1029, as " Cæspitosa ; peritheciis carneis, materie alba velata, collabentibus ; ascis linearibus ; sporidiis oblongis ellipticis uniseptatis. Sporidia 12·5–13 × 5–6·25 μ." The type specimen is Thwaites 646.

The perithecia are about 0·3 mm. diameter, globose, collapsing, crowded in pulvinate groups about 2 mm. diameter on a parenchymatous stroma. They are now pale grayish-yellow, with a minute conical ostiolum on a central dark area,

which in some cases appears almost black. The wall appears pruinose, its outer layer being composed of loosely interwoven, thick-walled, often irregular hyphæ, collected here and there into loose masses. The asci are cylindric, sessile, eight-spored, with obliquely uniseriate spores, about 50 × 6 μ. The spores are oval, hyaline, not, or slightly, constricted at the septum, sometimes attenuated towards one end, minutely rough, 9–13 × 4–5 μ.

The type specimen in Herb. Kew is too ripe to show asci, but they are evident in the co-type in Herb. Peradeniya. von Höhnel (Mitt. XIV., p. 20) writes that he was unable to confirm Starback's statement that the spores are rough; they are rough in the perithecium from the type examined by me.

Hypoxylon umbrinellum B. & Br.

This was described in Fungi of Ceylon, No. 1075, as "Late effusum; peritheciis minutis ovatis metulæformibusque umbrinellis materie furfuracea vestitis; ascis linearibus; sporis subellipticis, uniseptatis, demum echinulatis (No. 1111). On dead wood with Byssisedæ. Margin of the stroma often barren, as in *H. rubiginosum;* sporidia 12·5 by 6·25 μ." In Saccardo, I., p. 729, it was listed, with a query, as *Amphisphæria.*

In the co-type in Herb. Peradeniya the perithecia are quite separate from one another, but crowded side by side in a flat layer, with a slight basal layer of mycelium. They appear dark brown or blackish-brown, but the wall when mounted is yellow-brown to red-brown. They are ovoid, 0·3 mm. diameter, and 0·4 mm. high, with a papillate ostiolum, pruinose. The wall is composed of rather large thin-walled cells, and is rough with slightly projecting cells and small scattered warts. The asci are clavate, sessile, eight-spored, with obliquely uniseriate spores, 60–70 × 8 μ. The spores are elliptic to fusoid, ends obtuse, one-septate, occasionally constricted, pale brown, wall striate with coarse ridges which are often broken, 11–15 × 5–6 μ.

In Ann. Perad., VI., p. 345, this species was transferred to *Phæonectria.* Cooke, however, had previously discovered

that it was a *Nectria*, and had enumerated it under *Bysso-nectria*, subgenus *Hyphonectria*, in Grevillea, XII., p. 109. From the specimens available it is doubtful whether the mycelium belongs to the *Nectria*. The species would appear to stand best as *Cosmospora*.

Nectria Dorcas (B. & Br.) Cooke.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 944, as "*Peziza* (*Dasycyphæ*) *Dorcas* B. & Br. Sessilis, globosa, aperta, extus cervina tomentosa; hymenio fusco; sporidiis subellipticis, medio constrictis, biseriatis uniseptatis binucleatis (No. 275). On some monocotyledonous plant, scattered over the bark, looking at first much like a villous *Sphæria*. Sporidia 12·5 μ long." It was included in Saccardo as *Solenopezia*. Cooke, in Grevillea, XII. (1884), p. 82, re-described it as "*Dialonectria Dorcas*. Superficialis, sparsa, globosa, demum collapsa et cupulæformis. Peritheciis extus cervino-tomentosis. Ostiolo fusco. Sporidiis subellipticis, medio constrictis, biseriatis, uniseptatis, hyalinis, 12 × 4·5 μ." Massee, in Journal of Botany, XXXIV. (1896) refers to it as *Peziza*.

The perithecia are yellowish-brown to fawn-coloured, globose, 0·3 mm. diameter, scattered or clustered. When dry the centre collapses. They are densely clothed with interwoven hyphæ, hyaline or brownish in colour, with free spreading ends, nodular above, up to 30 × 4 μ. The asci are clavate, eight-spored, spores biseriate, 80 × 12 μ, furnished with slender paraphyses. The spores are oblong-oval, ends rounded, one-septate, not constricted at the septum, 12–16 × 5 μ, wall faintly striate. In Saccardo's classification this is *Lasionectria;* it is included in the section *Lasionectria* in Saccardo, IX., p. 970.

Nectriella gigaspora Cke. & Mass.

This species was found by Cooke and Massee among the Ceylon specimens in Berkeley's herbarium, and was described by them in Grevillea, XVII., p. 42, as "Gregaria vel sparsa. Peritheciis minutis, aurantiis, pyriformibus vel ellipticis, glabris; ostiolo conico. Ascis lanceolatis, 150 μ long,

octosporis. Sporidiis elliptico-lanceolatis, continuis, granulosis, hyalinis, 30–33 × 10 μ. On *Botryosphæria inflata*, Habgalla, Ceylon (542)." I was unable to find *Nectriella gigaspora* on the type of *Botryosphæria inflata* in Herb. Kew, but there are specimens in Herb. Peradeniya, Thwaites 1107, sub *Nectria suffulta*.

The perithecia are about 0·4 mm. diameter, collapsed, dark red, pruinose, with a thin wall of rather large, thick-walled cells, up to 14 μ broad. They are solitary, or in small groups on an erumpent stroma. The Peradeniya specimens are too old to show complete asci. The spores are oval, thick-walled, verrucose, pale yellow, continuous, 34–54 × 15–28 μ. It appears to be parasitic on a *Sphæria*. According to modern classification, this must be known as *Pseudonectria gigaspora*.

Nectria fenestrata Berk. & Curt.

As previously stated in Ann. Perad., VI., p. 172, this species was described by Cooke in Grevillea, XII., p. 81, from specimens in Berkeley's herbarium. In the cover of this species in Herb. Kew there is a drawing, marked Ceylon 28, which bears a note in Berkeley's handwriting: "A *Nectria* mixed with *Sphærostilbe*." There is an abundance of specimens, which are Thwaites No. 48. On the same sheet is a specimen from Canada, labelled "*Sphærostilbe pseudotrichia*, *Nectria fenestrata*." The specimens are *Megalonectria pseudotrichia* Schw., and 28 and 48 are the Thwaites's numbers recorded by Berkeley and Broome for that species. Apparently Berkeley discovered that his *Nectria fenestrata* was *Megalonectria pseudotrichia*, and did not publish the former name.

Nectria myriadea Ces.

This species was collected by Beccari and described by Cesati. The description is "Perithecia minutissima, conferta, ovata, demum collapsa, pallide aurantia, tenuiter granulosa. Asci lineares, 0018 longi. Sporidia oblique monosticha, naviculæformia, continua, 1-guttulata, 5 × 3. Secundum mensuram Cookii = 016 × 008. Ad lignum nudum." It was included in Saccardo, II., p. 450, as *Nectriella*, the length of the ascus being given as 54 μ. Cesati's unit was 2 μ; hence

his measurement of the spore is 10 × 6 μ, while Cooke's is in millimetres, and is consequently 16 × 8 μ. The ascus measurement is not in accordance with Cesati's declared practice, and would appear to be in decimals of an inch, following the example of Berkeley and Broome.

Cooke, in Grevillea, XII., p. 110, referred this species to *Cosmospora* (as a subgenus).

There is a specimen from Cesati in Herb. Kew. The perithecia are scattered or crowded, superficial, without a stroma, ovoid, about 0·25 mm. diameter, collapsing, orange-red, pruinose. The perithecial wall is composed of large cells, about 10 μ diameter, and bears loosely-built, small warts of large cells, or scattered isolated projecting cells. The asci are eight-spored, cylindric, with sporos uniseriate or obliquely uniseriate, 90–110 × 8–10 μ. The spores are oval, one-septate, not constricted at the septum, ends obtuse or subacute, brown, coarsely verrucose with warts and short ridges arranged in longitudinal lines, 10–16 × 5–8 μ.

Cooke's reference to *Cosmospora* is consequently correct.

Nectria tabacina Ces.

This species was collected in Ceylon by Beccari and described by Cesati. The description is " Perithecia minutissima, conferta, obovata, ostiolo acuto, demum fusco-ochracea, collapsa. Asci nulli adsunt, sed tantum sporidia oblonga, 00025, obscure septata ?, hyalina. Ad Polypori ? frustula. *Nectriæ peziæ* haud dissimilis. Vix *N. suffulta* B. & Br." Cooke, in Grevillea, XII., p. 110, included it under *Eu-dialonectria* without comment. There is a specimen from Cesati in Herb. Kew. It is listed in Saccardo as *Nectria*, the spores being given as 25 μ long.

In the specimen in Herb. Kew the host is not a fungus, but the wall of some fruit, apparently a mangosteen (*Garcinia mangostana*). The perithecia are superficial, gregarious, about 0·4 mm. diameter, dark red, pruinose with yellow granules, globose, with a conical ostiolum, collapsing. The perithecial wall is composed of large thin-walled cells, tangentially elongated and circularly arranged round the ostiolum. Among the perithecia are a few dark red, stout hyphæ (?) up

to 16 μ in diameter. Asci were not found. The spores are narrow-oval, ends obtuse, yellow, 12–16 × 5–7 μ, with a mucilaginous coat ; they are continuous, but sometimes appear septate owing to a separation of the cell contents.

On the available specimens this species must be referred to *Pseudonectria*.

Nectria confusa v. H.

This species was found by von Höhnel, included in the type of *Nectria subquaternata* in Herb. Kew, and was described by him in Mitt. XIV. p. 34. It is included in Thwaites 173 in Herb. Peradeniya.

The perithecia in the type are situated in small, flat groups on a weakly-developed erumpent stroma. They are now white, or pale yellowish, oval, about 0·25 mm. diameter, with from three to five large warts or segments near the apex, which extend horizontally round the ostiolum. These warts are up to 120 μ long and 80 μ broad, and consist of rather small thick-walled cells. The asci are clavate, sessile, eight-spored, 66–80 × 12 μ. The spores are oval to subfusoid, not constricted, faintly longitudinally striate, 19–22 × 7–10 μ.

In a recent gathering from Hakgala, No. 4440 in Herb., Peradeniya, the perithecia were pale red, or orange-red, when fresh becoming orange yellow when dry. They are subtranslucent, and are gregarious on an erumpent, subtranslucent, horny-looking stroma. The warts are composed of large, thick-walled, rounded cells, the wall being usually unequally thickened, and sometimes 6 μ thick on one side. The spores are smaller than in the type, measuring 13–16 × 6–7 μ.

Systematic List.

Hyponectria.

Hyponectria Memecyli Petch, Ann. Perad., VI., p. 328 ; *Sphæria* (*Obturatæ*) *Chionanthi* B. & Br., Fungi of Ceylon, No. 1114 ; *Didymella Chionanthi* (B. & Br.) Sacc., Syll. Fung., I., p. 549 ; *Sphærella Chionanthi* (B. & Br.) Cooke, Jour. Bot., 1883, p. 107.

Hyponectria Embeliæ Petch, Ann. Perad., VI., p. 228.

PSEUDONECTRIA.

Pseudonectria gigaspora (Cooke & Mass.) Petch ; *Dialonectria* (*Nectriella*) *gigaspora* Cooke & Mass., Grevillea, XVII., p. 42 ; *Nectriella gigaspora* Cke. & Mass., Saccardo, Syll. Fung., IX., p. 942.

Pseudonectria tabacina (Ces.) Petch ; *Nectria tabacina* Ces., Myceti in itinere Borneensi, p. 15 ; *Dialonectria* (*Eu-dialonectria*) *tabacina* (Ces.) Cooke, Grevillea, XII., p. 110.

MELANOSPORA.

Melanospora parasitica Tul.

NEOCOSMOSPORA.

Neocosmospora vasinfecta Sm.

NECTRIA.

(1) *Eunectria.*

Nectria bactridioides B. & Br., Fungi of Ceylon, No. 1010 ; *Nectria* (*Metanectria*) *bactridioides* (B. & Br.) Cooke, Grevillea, XII., p. 107.

Nectria stenospora B. & Br., Fungi of Ceylon, No. 1011 ; *Nectria* (*Metanectria*) *stenospora* (B. & Br.) Cooke, Grevillea, XII., p. 107.

Nectria bicolor B. & Br., Fungi of Ceylon, No. 1023 ; *Nectria* (*Metanectria*) *bicolor* (B. & C.) Cooke, Grevillea, XII., p. 107.

Nectria striatospora Zimm. ; *Nectria sanguinea* in B. & Br., Fungi of Ceylon, No. 1017 (in part) ; *Nectria cinnabarina* in B. & Br., Fungi of Ceylon, No. 1022 (in part).

Perithecia usually crowded, in groups up to 5 mm. diameter, on an erumpent stroma, globose, 0·4 mm. diameter, with a broad discoid apex, 0·15 mm. diameter, 0·05 mm. high, flat or broadly conical on the upper surface, blood red, becoming dark red, apex dark red, appearing almost black, smooth or slightly pruinose ; wall of the perithecium orange when mounted, of large cells, a few of which sometimes project, somewhat amorphous exteriorly. Asci clavate,

eight-spored, spores obliquely uniseriate or biseriate, 90 × 13–18 μ. Spores oval or subcymbiform, ends rounded, one-septate, not constricted at the septum, wall distinctly longitudinally striate, 18–34 × 8–13 μ.

This species is common in Ceylon. It was included in Thwaites's collections, but was assigned by Berkeley and Broome to *Nectria sanguinea, ex* Thwaites 29, and *Nectria cinnabarina, ex* Thwaites 1102.

According to von Höhnel and Weese (Ann. Myc., IX., p. 423), *Nectria striatospora* Zimm. = *Nectria discophora* Mont.

Nectria lucida v. Höhnel. Perithecia usually in clusters in small numbers on a feebly developed stroma, or often occurring singly, globose, or ovoid, 0·35 mm. diameter, with a small flat, not elevated, apical disc, and a minute conical ostiolum, glabrous, blood red, becoming dark red, darkening especially at the ostiolum and round the margin of the apical disc. Wall of the perithecium almost opaque when mounted. Asci cylindric, eight-spored, 70–100 × 6–8 μ. Spores oval or cymbiform, ends obtuse, one-septate, not, or slightly, constricted at the septum, hyaline, 10–16 × 5–7 μ.

Common at Hakgala, especially on *Acacia*.

(2) *Dialonectria*.

Nectria Bambusæ B. & Br., Fungi of Ceylon, No. 1015; *Nectriella Bambusæ* (B. & Br.) Sacc., Syll. Fung., II., p. 450; *Dialonectria* (*Nectriella*) *Bambusæ* (B. & Br.) Cooke, Grevillea, XII., p. 109; *Pseudonectria Bambusæ* (B. & Br.) v. H., Mitt. XIV., p. 16.

Nectria discoidea n. sp. Perithecia scattered, superficial, pale brown, opaque, collapsing and becoming discoid, 0·2 mm. diameter, depressed in the centre, smooth. Wall thin, composed of large, thick-walled cells up to 12 μ broad, pale brown by transmitted light. Ostiolum not projecting. Asci clavate, eight-spored, spores obliquely uniseriate, or biseriate, 35–45 × 6–8 μ. Spores hyaline, narrow-oval, ends obtuse, one-septate, not constricted at the septum, smooth, 10–14 × 3·5–4 μ. On a decaying *Xylaria*, Hakgala, May, 1913; No. 4577 in Herb. Peradeniya.

Nectria bomba n. sp. Perithecia scattered or crowded, without a stroma, globose, up to 0·3 mm. diameter, not collapsing, bright red, opaque, very minutely rugose, sometimes with a few minute yellow granules; ostiolum conical, on a darker red area, becoming almost black. Wall thick, of rather large cells, up to 12 μ. diameter below, becoming more or less opaque and obscure above. Asci at first subcylindric, truncate at the apex, eight-spored, spores obliquely uniseriate, about 80 × 8 μ. Asci and paraphyses soon diffluent and emerging in a jelly-like mass when the perithecium is compressed. Spores oval to cymbiform, not, or slightly, constricted, ends obtuse, 10–16 × 4·5–6 μ. On a dead *Hevea*-log, Peradeniya, October, 1919; No. 6122 in Herb. Peradeniya.

(3) *Lepidonectria.*

Nectria hæmatococca B. & Br., Fungi of Ceylon, No. 1018; *Nectria* (*Dialonectria*) *hæmatococca* (B. & Br.) Sacc., Syll. Fung., II., p. 496; *Dialonectria* (*Eu-dialonectria*) *hæmatococca* (B. & Br.) Cooke, Grevillea, XII., p. 110; *Nectria* (*Lepidonectria*) *luteococcinea* v. H., Mitt. XIV., p. 30; *Nectria diversispora* Petch, Ann. Perad., III., p. 4; *Nectria cancri* Rutgers, Ann. Jard. Bot. Buitenzorg, Ser. 2, XII., pp. 59–64 (from the description).

Nectria subquaternata B. & Br., Fungi of Ceylon, No. 1026; *Nectria* (*Lepidonectria*) *subquaternata* (B. & Br.) Cooke, Grevillea, XII., p. 107.

Nectria confusa v. H., Mitt. XIV., p. 34; *Nectria subquaternata* B. & Br., in part, in Fungi of Ceylon, No. 1026.

Nectria dealbata B. & Br., Fungi of Ceylon, No. 1029; *Nectria* (*Lepidonectria*) *dealbata* (B. & Br.) Sacc., Syll. Fung., II., p. 504; *Nectria* (*Lepidonectria*) *dealbata* (B. & R.) Cooke, Grevillea, XII., p. 107.

Nectria Berkeleyi v. H., Mitt. XIV., p. 17; *Nectria pityrodes* Mont., var. *saccharina* B. & Br., in Fungi of Ceylon, No. 1027.

Nectria pulcherrima B. & Br., Fungi of Ceylon, No. 1021; *Calonectria pulcherrima* (B. & Br.) Sacc., Michelia, I., p. 315; *Nectria* (*Lepidonectria*) *pulcherrima* (B. & Br.) Cooke, Grevillea, XII., p. 107.

? Nectria ostiolorum Berk. & Cooke. Perithecia scattered, superficial, globose, 0·2 mm. diameter, orange yellow, amber-coloured when dry, subtranslucent, more or less pruinose with scattered, projecting, or adherent, cells. Wall hyaline by transmitted light, of rather large cells up to 12 μ broad. Ostiolum minute, conical. Asci clavate, eight-spored, spores uniseriate, obliquely uniseriate, or biseriate, 40–50 × 6–8 μ. Spores oval, hyaline, one-septate, not constricted at the septum, minutely verrucose, 8–13 × 4 μ. On a decaying *Xylaria*, Hakgala, April, 1912 ; No. 3542 in Herb. Peradeniya.

The specimen distributed in Baker, Fungi Malayana, No. 166, Supplement, as *Nectria episphæria* (Tode) Fr., on *Eutypella heteracantha* on *Citrus decumana* (det. Saccardo) is this species in the set in Herb. Peradeniya. It differs completely from *Nectria episphæria* as described by Seaver in Mycologia, I., p. 65.

I have placed this species provisionally under *Nectria ostiolorum* Berk. & Cooke. It agrees with their brief description, except that the perithecia are not notably " Ostiolo pertuso " ; the latter character might, however, be due to age.

(4) *Hyphonectria*.

Nectria byssicola B. & Br., Fungi of Ceylon, No. 1025 ; *Byssonectria* (*Hyphonectria*) *byssiseda* (B. &. Br.) Cooke, Grevillea, XII., p. 109.

Nectria albofulta n. sp. Perithecia globose, or broadly conoid, scattered or in small groups on a well-developed, white, byssoid subiculum, minute, 0·15 mm. diameter, yellowish-red to blood red, translucent, very minutely rough ; ostiolum minute, conical. Wall of perithecium thin, composed of large cells, the external cells sometimes produced into conical processes up to 30 μ high. Asci clavate, scarcely pedicelled, eight-spored, 45–50 × 7–8 μ. Spores narrow-oval to subfusoid, one-septate, slightly constricted at the septum, ends obtuse, 9–11 × 3–4·5 μ. On dead stems of *Beloperone oblongata*, Peradeniya, February, 1917 ; No. 4958 in Herb. Peradeniya

(5) *Lasionectria.*

Nectria flavolanata B. & Br., Fungi of Ceylon, No. 1008; *Byssonectria* (*Hyphonectria*) *flavolanata* (B. & Br.) Cooke, Grevillea, XII., p. 109; *Nectria flocculenta* (H. & N.) v. H., Mitt. XIV., p. 31.

Nectria Dorcas (B. & Br.) Cooke; *Peziza* (*Dasycyphæ*) *Dorcas* B. & Br., Fungi of Ceylon, No. 944; *Dialonectria Dorcas* (B. & Br.) Cooke, Grevillea, XII., p. 82; *Lasionectria Dorcas* (B. & Br.) Cooke, Grevillea, XII., p. 112; *Peziza Dorcas* B. & Br., Massee, Jour. Botany, XXXIV. (1896), p. 146; *Nectria Dorcas* (B. & Br.) Cooke, Petch, Ann. Perad., VI., p. 171.

Nectria sulcispora n. sp. Perithecia scattered, superficial, broadly conoid, 0·2 mm. diameter, 0·15 mm. high, not collapsing, ostiolum papillate, dark yellow-brown, densely clothed up to the ostiolum with slender white hyphæ in floccose masses. Wall pale brown by transmitted light, of rather small, thick-walled cells. Asci clavate, eight-spored, spores obliquely uniseriate or biseriate, 50–60 × 10–12 μ. Spores oval, hyaline, one-septate, not constricted, obliquely longitudinally ridged, 10–13 × 4–6 μ. On a decaying *Xylaria*, Hakgala, May, 1913; No. 4577A in Herb. Peradeniya.

(6) *Cosmospora.*

Nectria fuliginosa B. & Br., Fungi of Ceylon, No. 1019; *Nectria* (*Dialonectria*) *fuliginosa* B. & Br., Sacc., Syll. Fung., II., p. 496; *Dialonectria* (*Cosmospora*) *fuliginosa* (B. & Br.) Cooke, Grevillea, XII., p. 110.

Nectria myriadea Ces.; *Nectriella myriadea* (Ces.) Sacc., Syll. Fung., II., p. 450; *Dialonectria* (*Cosmospora*) *myriadea* (Ces.) Cooke, Grevillea, XII., p. 110.

Nectria umbrinella (B & Br.) Cooke; *Hypoxylon umbrinellum* B. & Br., Fungi of Ceylon, No. 1075; *Amphisphæria? umbrinella* (B. & Br.) Sacc., Syll. Fung., I., p. 729; *Byssonectria* (*Hyphonectria*) *umbrinella* (B. & Br.) Cooke, Grevillea, XII., p. 109; *Phæonectria umbrinella* (B. & Br.) Petch, Ann. Perad., VI., p. 344.

Nectria (Cosmospora) Rickii Rehm. This species occurs at all elevations on decaying *Ustulina zonata* Lev.

The perithecia are superficial, scattered or gregarious, conoid, rounded below, up to 0·15 mm. diameter and 0·2 mm. high, blood red to orange red, smooth, shining. The wall, by transmitted light, is red-brown or yellow-brown, yellow round the ostiolum, and somewhat amorphous. The asci are cylindric, not pedicellate, with a truncate apex, which at first is thickened, 50–70 × 4–6 μ, spores uniseriate or obliquely uniseriate. Linear paraphyses are present. The spores are oblong-oval, with rounded ends, one-septate, constricted at the septum, strongly verrucose, pale brown, 7–9 × 3–4 μ.

(7) *Neohenningsia.*

Nectria confluens n. sp. (see p. 114) ; *Nectria suffulta* B. & C. (in part), in B. & Br., Fungi of Ceylon, No. 1020.

Dubia.

Nectria villigera B. & Br.

Excludendæ.

Nectria coccinea Fr.
Nectria Peziza Fr.
Nectria sanguinea Fr.
Nectria cinnabarina Fr.
Nectria fenestrata Cooke = *Megalonectria pseudotrichia* (Schw.).
Nectria pityrodes Mont.
Nectria gyrosa B. & Br. = *Endothia tropicalis* Shear & Stevens.

BRESADOLELLA.

Bresadolella nigra n. sp. Perithecia black, scattered, on a compact, effused, white, or brownish-white, stroma, 0·15 mm. thick, which extends over several centimetres. Perithecia globose, 66–100 μ diameter, or depresso-globose, 100 μ diameter, 70 μ high ; wall parenchymatous, fuscous, bearing a few scattered black-brown conical setæ 34 μ long, 7 μ diameter at the base, with acute tips ; ostiolum obtuse or slightly papillate. Asci cylindric 30–34 × 3 μ, becoming clavate and 6 μ broad, eight-, then sixteen-spored. Spores

oval, one-septate, constricted at the septum, ends obtuse, 5 × 2.5 μ, dividing in the ascus into globose, slightly rough, hyaline part-spores, 2–3 μ. diameter, usually arranged in two rows. Hakgala, April, 1919; No. 5969 in Herb. Peradeniya.

The basal layer contains what are apparently aborted perithecial cavities, and is probably a *Hypocrea*, on which the *Bresadolella* is parasitic.

Sphærostilbe.

Sphærostilbe repens B. & Br., Fungi of Ceylon, No. 1005.

Sphærostilbe variabilis B. & Br., Fungi of Ceylon, No. 1006.

Sphærostilbe aurantiicola (B. & Br.) Petch; *Nectria aurantiicola* B. & Br., Fungi of Ceylon, No. 1029; *Nectria* (*Metanectria*) *aurantiicola* (B. & Br.) Cooke, Grevillea, XII., p. 107; *Corallomyces aurantiicola* (B. & Br.) v. Höhnel, Mitt. XIV., p. 14.

Sphærostilbe coccidophthora (Zimm.) Petch.

Dubia.

Sphærostilbe incerta Ces.

Excludenda.

Sphærostilbe gracilipes Tul.

Hypocrea.

(*a*) *Spores hyaline.*

Hypocrea pezizoides B. & Br., Fungi of Ceylon, No. 988.

Hypocrea jecorina B. & Br., Fungi of Ceylon, No. 989; *Hypocrea gelatinosa* var. *umbrina* Ces.; *Hypocrea umbrina* Cooke.

Hypocrea gigantea n. sp. Stromata irregularly globose or laterally ovoid, up to 4 cm. long, 3 cm. broad, and 3 cm. high, plicate at the sides and contracted below to a small area of attachment, often clustered, sometimes pulvinate with a flat plicate base, centrally attached, buff or pinkish-buff, glabrous, opaque; ostiola pale brown, inconspicuous, not projecting; internally white, radially fibrillose, the

outer perithecial layer separating readily from the context. Perithecia crowded in a distinct peripheral zone, vertically oval, up to 0·4 mm. high, 0·25 mm. diameter, wall hyaline. Asci cylindric, 70 × 4 μ, eight-, then sixteen-spored. Part-spores globose, 3–4 μ diameter, or oval 4–5 × 3–3·5 μ, hyaline, faintly warted, No. 2361, Peradeniya, 1907; No. 4881, Henaratgoda, July, 1916; No. 6032, Waga, March, 1917.

Hypocrea brunnea n. sp. Stromata circular, irregularly pulvinate, up to 1·2 mm. diameter and 0·6 mm. high, pale red-brown, uniformly coloured, glabrous, not translucent, ostiola not evident, perithecial elevations distinct; internally white, friable. Perithecia globose, 0·2 mm. diameter, wall hyaline or pale yellowish. Asci 96 × 5 μ. Part-spores globose, 3·5–5 μ diameter, or cuboid, 4 × 3 μ, spinulose, hyaline; extruded spores white in mass. On dead wood, Hakgala, April, 1919; No. 6008 in Herb. Peradeniya.

Somewhat resembles *Hypocrea discella*, but has inconspicuous ostiola, larger spores, and a pale perithecial wall. In *Hypocrea discella* the spores are distinctly greenish-yellow.

Hypocrea confusa n. sp. (see p. 94); *Hypocrea rufa* Fr., in B. & Br., Fungi of Ceylon, No. 991.

Hypocrea albofulva B. & Br., Fungi of Ceylon, No. 996.

Hypocrea straminea n. sp. (see p. 97); *Hypocrea citrina* Fr., in B. & Br., Fungi of Ceylon, No. 997.

Hypocrea extensa n. sp. Stromata circular, up to 1 cm. diameter, or confluent in irregular patches extending over several centimetres, plane, thin, about 0·3 mm. thick, pale yellow, densely covered with brown ostiola, glabrous, opaque, even; margin definite, not byssoid, recurved when dry; internally white, with a yellow cortical layer. Perithecia globose, up to 0·1 mm. diameter, or flask-shaped, crowded, wall yellow. Asci, sporiferous part, 42–56 × 3–4 μ, eight-, then sixteen-spored. Part-spores globose, hyaline, faintly warted, 2·5–3 μ diameter. On a dead branch, Peradeniya, January, 1912; No. 3419 in Herb. Peradeniya.

(*b*) *Spores coloured, green to greenish-yellow.*

Hypocrea catoptron B. & Br., Fungi of Ceylon, No. 990.

Hypocrea palmicola B. & Br., Fungi of Ceylon, No. 994; *Hypocrea lenta* Fr., in B. & Br., Fungi of Ceylon, No. 992.

Hypocrea chlorostoma n. sp. Stromata discoid, upper surface slightly convex, even, up to 4 mm. diameter and 0·5 mm. thick, margin rounded, yellow-brown, then sordid brown, with dark green ostiola, internally yellowish-white, not translucent; when dry (herbarium specimens) becoming rugose, dark red-brown, ostiola not evident, or blackish-green above and red-brown at the sides, and blackish-green internally. Perithecia globose, 0·1–0·15 mm. diameter, or laterally oval, 0·18 mm. diameter, 0·1 mm. high, deeply sunk in about the middle of the stroma; perithecial wall greenish-yellow when fresh, yellow-brown in herbarium specimens. Asci, eight-, then sixteen-spored, 60–64 × 4 μ. Spores light green when fresh, blackish-green in herbarium specimens, verrucose, generally globose, 3·5–4 μ, some oval, 4 × 3 μ. On dead wood, Peradeniya, September, 1914; No 4109 in Herb. Peradeniya.

Hypocrea mellea n. sp. Stromata subtranslucent, pale yellow-brown or honey coloured with brown ostiola when fresh, becoming red-brown with blackish ostiola when dry, pulvinate, up to 4 mm. diameter, margin rounded, attached over nearly the whole base or over a central area about half the diameter of the base; surface even, sometimes becoming rugose in drying. Internally pale yellow and fleshy when fresh, yellowish-white and corky, or sometimes friable, when dry. Perithecia usually vertically oval, up to 0·3 mm. high, 0·1–0·15 mm. diameter, sometimes globose, 0·2 mm. diameter, situated at varying depths; perithecial wall yellow-brown. Asci 65–75 × 4 μ. Part-spores oval 5–6 × 4 μ, or globose 4–5 μ diameter, spinulose, yellow or greenish-yellow; extruded spore masses yellow. Hakgala, September, 1908; No. 3006 in Herb. Peradeniya.

This species resembles the one attributed to *Hypocrea rufa* by Berkeley and Broome, but differs in having its perithecia situated at different depths, its yellow spores, and the absence of a white edge in the young stromata.

Hypocrea discella B. & Br., Fungi of Ceylon, No. 984.

Hypocrea deplanata B. & Br., Fungi of Ceylon, No. 985.

Dubiæ.

Hypocrea artocreas B. & Br., Fungi of Ceylon, No. 983.

Hypocrea saccharina var. *agaricicola* B. & Br., Fungi of Ceylon, No. 987.

Excludendæ.

Hypocrea Bambusæ B. & Br., Fungi of Ceylon, No. 999.= *Balansia Bambusæ* (B. & Br.) Petch, Ann. Perad., VI., p. 170.

Hypocrea discoidea B. & Br., Fungi of Ceylon, No. 998 = *Hypocrella discoidea* (B. & Br.) Sacc., Michelia, I., p. 322.

Hypocrea multiformis B. & Br., Fungi of Ceylon, No. 995.

Hypocrea citrina Fr.

Hypocrea rufa Fr.

Hypocrea umbrina Cooke = *Hypocrea jecorina* B. & Br.

Hypocrea lenta Fr.

CLINTONIELLA.

Clintoniella fusigera (B. & Br.), comb. nov. ; *Hypocrea fusigera* B. & Br., Fungi of Ceylon, No. 993.

Clintoniella corticioides (B. & Br.), comb. nov. ; *Hypocrea corticioides* B. & Br., Fungi of Ceylon, No. 986.

PODOCREA.

Podocrea zeylanica Petch, Ann. Perad., VI., p. 230.

HYPOMYCES.

Hypomyces pæonius B. & Br., Fungi of Ceylon, No. 1000.

Hypomyces chrysostomus B. & Br., Fungi of Ceylon, No. 1001.

Hypomyces chromaticus B. & Br., Fungi of Ceylon, No. 1002.

Hypomyces flavolanatus Petch, Ann. Perad., VI., p. 229.

Hypomyces pallidus n. sp. On decaying agarics. Mycelium white, compact, filling the interstices between the gills, and converting the pileus into a solid mass with radial ribs.

Conidiophores verticillioid, up to 150 μ high, 4 μ diameter below, septate; conidia not seen. Perithecia immersed, ostiola projecting, sometimes subsuperficial, hyaline, globose or ovoid, up to 0·4 mm. high, 0·2 mm. diameter; ostiolum papillæform. Asci cylindric, eight-spored, spores uniseriate or obliquely uniseriate, 100–110 × 6 μ. Spores narrow-oval, inequilateral, or fusoid, hyaline, white in mass, one-septate, not, or slightly, constricted, minutely spinulose, ends obtuse without solid tips, 9–13 × 3–4 μ. Deviturai, August, 1917; No. 5338 in Herb. Peradeniya.

NEOSKOFITZIA.

Neoskofitzia monilifera (B. & Br.) v. H., Mitt. XIV., p. 38; *Nectria monilifera* B. & Br., Fungi of Ceylon, No. 1007; *Nectriella monilifera* (B. & Br.) Sacc., Michelia, I., p. 279; *Dialonectria* (*Eu-dialonectria*) *monilifera* (B. & C.) Cooke, Grevillea, XII., p. 110; *Neoskofitzia termitum* v. H., Mitt. V., No. 169.

CALONECTRIA.

Calonectria rigidiuscula (B. & Br.) Sacc., Michelia, I., p. 313; *Nectria rigidiuscula* B. & Br., Fungi of Ceylon, No. 1024; *Nectria* (*Calonectria*) *rigidiuscula* B. & Br., Cooke, Grevillea, XII., p. 107; *Calonectria sulcata* Starb.; *Calonectria Meliæ* Zimm.

Calonectria volutella (B. & Br.) Sacc., Michelia, I., p. 309; *Nectria volutella* B. & Br., Fungi of Ceylon, No. 1013; *Lasionectria volutella* (B. & Br.) Cooke, Grevillea, XII., p. 112.

Calonectria oodes n. sp. Perithecia scattered, superficial, globose, 0·25 mm. diameter, collapsing when dry, subtranslucent, lemon-yellow to orange-yellow, sometimes glabrous, usually covered with hyaline rigid hairs, 20–50 μ long, 5 μ diameter, tapering upwards to the acute or obtuse apex, slightly encrusted, often irregularly bent; ostiolum minute, scarcely evident, a small pore about 10 μ diameter, furnished with periphyses; wall indistinctly parenchymatous, yielding large oil drops when crushed. Asci clavate, apex subacute, eight-spored, spores obliquely uniseriate, 70 × 6(1)20 (19)

12 μ. No paraphyses. Spores hyaline, fusoid or narrow-oval, inequilateral, 5–7-septate, 18–29 × 5–6 μ. On a decaying stem, Peradeniya, June, 1919 ; No. 6009 in Herb. Peradeniya. At first sight appears astomate, and resembles a group of insect eggs.

Broomella.

Broomella niphidium (B. & Br.) Cooke, Grevillea, XII., p. 105 ; *Hypoxylon niphidium* B. &. Br., Fungi of Ceylon, No. 1067 ; *Melogramma niphidium* (B. & Br.) Sacc., Syll. Fung., II., p. 646 ; *Broomella niphidium* (B. & Br.) Petch, Ann. Perad., VI., p. 345.

Gibberella.

Gibberella rugosa n. sp. Perithecia solitary, or clustered in groups up to six, erumpent, without superficial stroma, sometimes with a slight whitish mycelium at the base, minute, 0·15 mm. diameter, ovoid or clavate, rough with prominent rounded warts, indigo or black, wall deep violet by transmitted light, ostiolum not elevated. Asci ovato-clavate, eight-spored, spores biseriate, 64–72 × 14–18 μ. Spores narrow-oval to subcymbiform, three-septate, not constricted at the septa, ends rounded, hyaline, 18–24 × 6–8 μ, exceptionally 32 × 8 μ. On dead twigs, Peradeniya, May, 1915 ; No. 4642 in Herb. Peradeniya.

Megalonectria.

Megalonectria pseudotrichia (Schw.) Speg. ; *Sphærostilbe pseudotrichia* Schw., in B. & Br., Fungi of Ceylon, No. 1004 ; *Nectria fenestrata* B. & C., in Cooke, Grevillea, XII., p. 81.

Ophionectria.

Ophionectria trichospora (B. & Br.) Sacc., Michelia, I., p. 323 ; *Nectria trichospora* B. & Br., Fungi of Ceylon, No. 1014 ; *Dialonectria* (*Ophionectria*) *trichospora* (B. & Br.) Cooke, Grevillea, XII., p. 111.

Ophionectria coccicola Ell. & Ev.

Micronectria.

Micronectria Eugeniæ n. sp. Spots yellow, dotted with black ostiola. Perithecia hypophyllous, immersed in the mesophyll, elevating the epidermis, but not erumpent, scattered, globose, or laterally oval, conical above, 0·15 mm. diameter; wall stout, yellow or brownish-yellow, becoming blackish-brown at the ostiolum. Asci oblongo-clavate, apex truncate, shortly pedicellate, eight-spored, 120 × 12 μ, spores in a parallel bundle, almost straight or spirally twisted. Paraphyses linear, sometimes inflated at the tips. Spores hyaline, linear, ends truncate, obscurely septate, 80–96 × 2 μ. On leaves of *Eugenia* sp., Hakgala, April, 1919; No. 5986 in Herb. Peradeniya.

Byssostilbe.

Byssostilbe stilbigera (B. & Br.) Petch, Ann. Perad., V., p. 296; *Hypomyces stilbiger* B. & Br., Fungi of Ceylon, No. 1003; *Berkelella stilbigera* (B. & Br.) Sacc., Syll. Fung., IX., p. 989; *Ophionectria Trichiæ* Penz. & Sacc., Icones Fungorum Javanicorum, p. 48, tab. 33, fig. 4.

Hypocrella.

Hypocrella discoidea (B. & Br.) Sacc.; *Hypocrea discoidea* B. & Br., Fungi of Ceylon, No. 998.

Hypocrella Raciborskii Zimm.

Hypocrella Mollii Koord.

Hypocrella Reineckiana Henn.

Hypocrella javanica (Penz. & Sacc.) Petch.

Hypocrella ceramichroa (B. & Br.) Petch; *Hypoxylon ceramichroum* B. & Br., Fungi of Ceylon, No. 1059; *Glaziella ceramichroa* (B. & Br.) Cooke, Grevillea, XI., p. 83.

Hypocrella oxystoma (Berk.) comb. nov.; *Aschersonia oxystoma* Berk., Hooker's Jour. of Bot., VI., p. 205.

Epichloe.

Epichloe cinerea B. & Br., Fungi of Ceylon, No. 982.

Claviceps.

An ergot occurs on *Paspalum sanguinale* Lam. at Peradeniya, and a *Sphacelia* on *Paspalum* sp. at Colombo. In the latter case, attention is drawn to the infected inflorescences by the numbers of flies which visit them.

Balansia.

Balansia brevis (B. & Br.) v. H., Mitt. XII., p. 63 ; *Ephelis brevis* B. & Br., Fungi of Ceylon, No. 800 ; *Ophiodothis brevis* (B. & Br.) Petch, Ann. Perad., IV., p. 431.

Balansia Bambusæ (B. & Br.) Petch, Ann. Perad., VI., p. 170 ; *Hypocrea Bambusæ* B. & Br., Fungi of Ceylon, No. 999 ; *Hypocrella Bambusæ* (B. & Br.) Sacc., Michelia, I., p. 323.

Balansiella.

Balansiella pulvinula (B. & Br.) Petch, Ann. Perad., VI., p. 172 ; *Epichloe pulvinulus* B. & Br., Fungi of Ceylon, No. 981 ; *Hypocrella pulvinula* (B. & Br.) Sacc., Syll. Fung., II., p. 581.

Bivonella.

Bivonella chrysomalla (B. & Br.) Sacc., Syll. Fung., IX., p. 990 ; *Melanospora chrysomalla* B. & Br., Fungi of Ceylon, No. 1125. Re-described Ann. Perad., IV., p. 436.

Recent Revisions of Ceylon Botany.

BY

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THE following notes relating to Ceylon plants have been compiled for the information of Ceylon botanists from the papers cited. In some cases it has been possible to add a few further details.

(1) Blatter, E., and Hallberg, F. A Revision of the Indian Species of Rotala and Ammania. Jour. Bombay Nat. Hist. Soc., XXV., pp. 701–722.

Under *Rotala verticillaris* L. (p. 705), *Ammania Rotala* Clke. non Muell., the authors refer to a Ceylon specimen of this species in Herb. S. Kurz. [*Ammania Rotala*, in Flora of Ceylon, III., 224.—*Ed.*]

(2) Dunn, S. T. Notes on the Flora of Madras. Kew Bulletin, 1916, pp. 58–65.

The notes on *Cyclea Burmanni* should receive attention from Ceylon botanists.

Cardamine subumbellata Hook. is said to be identical with the earlier *Cardamine trichocarpa* Hochst. *Capparis stylosa* DC. is adopted for *C. divaricata* W. & A. [See Flora of Ceylon, I., p. 61 : the Ceylon plant is insufficiently known.—*Ed.*] *Capparis zeylanica* Linn. is considered identical with *Capparis horrida* Linn. f. ; the author's interpretation of the specimens in Herb. Hermann differs from that of Trimen. According to Dunn's conclusions, the *Capparis zeylanica* of the Flora of Ceylon will be *C. brevispina* DC., as in Thwaites Enum, 15, but he does not cite Ceylon specimens. *Bergia capensis* L. is restored for *B. verticillata* Willd. *Abutilon hirtum* G. Don has precedence of *A. graveolens* W. & A., and *A. glaucum* Cav. of *A. muticum* G. Don.

(3) Gamble, J. S. Decades Kewenses. Kew Bulletin, 1916, pp. 131–136.

The following species new to Ceylon is described (p. 134) :—

878. *Ventilago lanceolata* Gamble [Rhamnaceæ-Ventilagineæ] ; *V. maderaspatanæ* Gaertn., affinis, foliis oblongo-lanceolatis acuminatis, floribus minutis, ovario glabro et calycis tubo fructifero patelliformi basi nucis solum adnato differt.

Frutex scandens, ramulis teretibus glabris vel juventute puberulis tandem nigrescentibus. *Folia* oblongo-lanceolata, apice acuminata, mucronata, basi inæqualiter subrotundata, 6–10 cm. longa, 2–4 cm. lata, chartacea, præcipue apicem versus crenata, juniora subtus puberula, tandem glabra ; nervi laterales utrinsecus 6–8, marginem versus curvati et nervulis transversis permultis parallelis horizontalibus juncti. *Flores* minuti, in glomerulis parvis secus ramulos sinuatos paniculorum axillarium vel lateralium fere sessiles. *Paniculæ* graciles, ferrugineo-villosæ, 2–7 cm. longæ, ramulis paucis vix 1 cm. longis ; bracteæ caducæ ; bracteolæ sub glomerulis plures lineares ; flores vix 2·5 mm. diametro. *Calyx* extra villosus, intus glaber. *Petala* minuta, lata, cucullata. *Stamina* fere sessilia, connectivo nigro apice recurvo. *Discus* glaber, complanatus. *Ovarium* glabrum ; styli 2, brevissimi. *Samara* circiter 5 cm. longa, oblanceolata, parce puberula reticulata, vix 1 cm. lata, juventute ferrugineo-tomentosa, nuce ad basin in calycis tubo persistente patelliforme insidenti.

South India. Kanota, Malabar District, Dec., 1913, C. A. Barber ; Tinnevelly Ghats, &c., 1873, Beddome.

Ceylon : Hantane ; at 600 m., Gardner 180 ; Walker 169.

(4) Gamble, J. S. Notes on the Flora of Madras. Kew Bulletin, 1918, pp. 222–228.

Under *Nothopegia* the author includes the following paragraph (p. 227) :—

" In his Flora Sylvatica of South India and Ceylon, Beddome gives Blume's description of *Nothopegia* (amplified to describe the flowers, &c.) and a Plate No. 164, drawn by Dr. Thwaites from a Ceylon specimen. Beddome's description and plate

are also quoted by Hooker and Engler under *N. Colebrookiana*. An examination of the plate, of Beddome's South Indian specimens and of Thwaites C. P. 1260, shows that the plant figured has oblong, long—but not always abruptly—acuminate thin leaves, to 5 in. long by 1 to 1·5 in. broad, very slender flower panicles, and a transversely oblong vertically more or less striate drupe with thin pericarp. It is quite unlike Wight's plant, and is distinct, in my opinion, from it. It differs less, perhaps, from *N. Dalzellii*, but the thin narrow leaves, nearly glabrous inflorescence, and striate fruit separate it, and I propose to call it *N. Beddomei*."

(5) Hill, A. W. The genus Strychnos in India and the East. Kew Bulletin, Nos. 4 and 5, 1917.

This thorough revision of the genus *Strychnos* in India and the East effects several changes in the nomenclature of the Ceylon species, and the number of Ceylon species is raised from seven to nine, three new names being proposed. The plant hitherto known as *S. colubrina* var. *zeylanica* is made a different species under the name *S. trichocalyx*, a plant included by Thwaites under S. *micrantha* is separated as *S. tetragona*, and another as *S. lenticellata*, while *S. coriacea* Thw. is restored.

Hill's remarks on the relationships and distribution of the Ceylon species of *Strychnos* are of interest.

"The Flora of Ceylon has recently been examined with regard to its endemic constituents, and as Trimen's Flora has been taken as the basis from which deductions have been drawn, it is worth while to inquire whether this re-investigation of the genus *Strychnos* affects the discussion to any extent.

"Trimen catalogues seven species, three of which he considers endemic in Ceylon; one of these three, however, *S. cinnamomifolia*, is represented in Travancore by so closely allied a variety that the plants from the two localities might almost be considered to be identical. Two varieties, *S. colubrina* var. *zeylanica* Clarke (= *S. trichocalyx* A. W. Hill), and *S. Beddomeii* var. *coriacea* (= *S. coriacea* Thw.), which he places with the plants common to India and Ceylon, have been wrongly assigned to their respective species by C. B. Clarke, and each is now found to be a good species.

" The re-examination of all the available material, which is by no means good, has resulted in the recognition of nine Sinhalese species of *Strychnos*, five of which are endemic. Two of these are represented in S. India by closely allied, but easily distinguished, species, and three appear to be peculiar to the Island.

" Particulars are set out in tabular form :—

Ceylon.	Southern India.	Andaman Islands.
Endemic Species.	*Representative Species.*	
S. Benthami Clarke and vars *S. coriacea* Thw. .. *S. tetragona* A. W. Hill ..	None.	
S. micrantha Thw. ..	*S. colubrina* Linn. ..	—
S. trichocalyx A. W. Hill ..	*S. Dalzellii* Clarke ..	—
S. cinnamomifolia Thw. ..	*S. cinnamomifolia* Thw. var. *Wightii* A. W. Hill	*S. tubiflora* A. W. Hill

Species common to Ceylon and India :—

S. lenticellata A. W. Hill ..	*S. lenticellata* A. W. Hill	—
S. Nux-vomica Linn. ..	*S. Nux-vomica* Linn. ..	—
S. potatorum Linn. ..	*S. potatorum* Linn. ..	—

" Of the species common to Ceylon and India, three (*S. Nux-vomica*, *S. potatorum*, and *S. lenticellata*) are dry country plants, and their occurrence in the drier parts of Ceylon, which may be considered both from the physical and geographical standpoint to be part of India, is to be expected. *S. cinnamomifolia* is a moist country plant of the tropical forests, and occurs in India in the forests of Travancore, &c. Here, again, physical conditions are very similar, and the floras of the two regions show many species in common. It is interesting to notice that a species apparently closely allied to *S. cinnamomifolia* is found in the Andaman Islands, but it is sufficiently distinct to be raised to specific rank, and has been described under the name *S. tubiflora* A. W. Hill. There is also some evidence that *S. cinnamomifolia* may occur in the tropical forests of Silhet, and *S. Pierriana* A. W. Hill from Annam appears to be a very closely allied species.

"The species endemic in Ceylon are of interest. *S. micrantha* and its closely allied representative species *S. colubrina* inhabit moist low country somewhat similar to the habitat of *S. cinnamomifolia*. *S. trichocalyx*, and its Indian representative *S. Dalzellii*, appear to be somewhat dry country plants, judging from their general facies and their stout coriaceous leaves. In these two species the hairs on the inside of the calyx lobes are unique in the genus, at least as far as the eastern species are concerned. Of the three remaining endemic species, *S. Benthami*, with its 4-merous flowers, is quite a distinct species peculiar to Ceylon, and occurs, as might be expected, in the central and southern regions. *S. coriacea*, also peculiar, inhabits the Central Province, and *S. tetragona* is apparently a low-country plant. With its trinerved, closely-veined leaves and glabrous ovary the latter species shows some resemblance to *S. ænea* A. W. Hill from Travancore. The anthers, however, in the Ceylon plant are slightly bearded, and the resemblance between the two species may only be superficial. It has seemed desirable to refer to the Ceylon species of *Strychnos* in some detail since erroneous deductions might be drawn from the statements published in Trimen's Flora."

Hill divides his material in four groups: (1) *Brevitubæ*, with a very short corolla tube, (2) *Lanigeræ*, with the corolla provided with long woolly hairs at the throat; (3) *Penicillatæ*, differentiated by the occurrence of a line of erect bristle-like hairs either across the base or across the middle of the inner face of the corolla lobes; and (4) *Tubifloræ*, with an elongated, cylindrical corolla tube.

The key to the Ceylon species is as follows :—

Section I.—Brevitubæ.

Corolla tube short; lobes of the corolla longer than the tube, lobes and throat glabrous or woolly tomentose.

Corolla lobes 5; anthers hairy; ovary and style glabrous.

S. tetragona.

Section II.—Lanigeræ.

Corolla furnished with woolly hairs at the throat or towards the base of the lobes and in the upper part of the tube ; lobes and tube more or less equal in length ; anthers glabrous in Ceylon species.

Ovary glabrous	*S. potatorum*
Ovary tomentose	
Leaves trinerved :—	
Corolla tomentose externally	*S. coriacea*
Corolla glabrous externally	*S. micrantha*
Leaves triplinerved	*S. lenticellata*

Section III.—Penicillatæ.

Lobes of the corolla furnished with a line of erect hairs.

Corolla lobes 4	*S. Benthami*
Corolla lobes 5	*S. trichocalyx*

Section IV.—Tubifloræ.

Corolla cylindric, elongated, with the tube much longer than the lobes.

Tree	*S. Nux-vomica*
Climber	*S. cinnamomifolia*

The following revised descriptions* of the Ceylon species are given :—

"**S. tetragona** A. W. Hill, species ramulis et pedunculis tetragonis, corolla campanulata tubo breve lobis repandis, antheris barbatis, ovario glabro distincta.

"*Frutex* ramis sulcatis in juventute tetragonis pubescentibus. *Folia* ovata vel obovato-elliptica, basi rotundata vel rotundato-cuneata, apice acute et longe acuminata, 6–9 cm. longa, 3–4 cm. lata, 5-nervia, superne vernicosa, nervis impressis, pagina inferiore nervis minute pubescentibus petioli circiter 5 mm. longi. *Inflorescentiæ* axillares, paniculatæ, 2·5–5 cm. longæ, pedunculis pedicellisque tetragonis sulcatis pubescentibus. *Calycis* segmenta triangulari-ovata, 0·75 mm. longa, plus minusve acuta, glabra, marginibus ciliatis. *Corolla* 3·5 mm.

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longa, lobis repandis circiter 2·5 mm. longis plurimo et ad faucem pilis laneis dense instructis, tubo campanulato glabro. *Antheræ* circiter 1 mm. longæ, ovatæ, basi paullo barbatæ vel subglabræ, filamentis 0·75–1 mm. longis. *Ovarium* globosum, cum stylo glabrum 2·25 cm. longum. *Fructus* ignotus. *S. micrantha* Thwaites, Enum. Plant. Zeyl. Add., p. 425; C. B. Clarke in Hook.f., Flor. Brit. Ind. IV., p. 86; Trimen, Fl. Ceylon, Pt. III., p. 172, omnes quoad C. P. 3720 partim.

"Ceylon. Without precise locality, Thwaites 3720 B. in Herb. Kew.

"This plant, included by Thwaites under *S. micrantha*, is quite distinct from the other plants placed by him under that species. The pubescent twigs and the pubescent nerves on the under surfaces of the leaves, the short campanulate corolla tube, bearded anthers and glabrous ovary and style mark this plant as a well-defined species.

"There are two distinct plants at Kew bearing the original label *Thwaites* 3720, one of which is rightly referred by Thwaites (Enum., p. 425) to *S. micrantha*. It was originally labelled *S. laurina*, and is included by C. B. Clarke (Fl. Brit. Ind., IV., p. 88) under *S. Beddomei*. The other plant—the type of the new species—was also seen by Clarke and placed under *S. micrantha* (Fl. Brit. Ind., IV., p. 86), for he refers to the glabrous ovary of C. P. 3720, although Thwaites, in his description, states that the ovary in *S. micrantha* (Enum., p. 425) is villous. *S. micrantha*, according to Clarke, l. c., is represented by C. P. 3720 (B.) and C. P. 1866, the latter a doubtful fruiting specimen—while *S. micrantha* Thwaites, includes C. P. 3540, 3720 (A.), of which there are two sheets at Kew, and 1866. In order to reconcile his own conception of *S. micrantha*, Clarke has removed Nos. 3540 and 3720 (A), with the ovary hairy, to his *S. Beddomei*, which is here considered synonymous with *S. colubrina*, the South Indian species.

"It is unfortunate that we have no definite knowledge of where this endemic species was collected. Since it bears the same number as specimens belonging to *S. micrantha* Thw., it may perhaps be concluded that it is a native of the low-country (see Trimen, Flor. Ceylon, III., p. 172).

" In its leaf and floral characters it shows some resemblance to *S. ænea* A. W. Hill. It differs especially in the slightly bearded anthers, the pubescent stems, and larger paniculate inflorescences.

" **S. potatorum** Linn. f., Suppl., p. 148 ; descr. ampl.

" *Inflorescentiæ* axillares, pedunculis pedicellisque glabris. *Calyx* glaber. *Corolla* 6·5–7 mm. longa, lobis 3–3·5 mm. longis fauceque pilis sparsis instructis. *Antheræ* 1 mm. longæ, glabræ, filamentis 1·5–1·75 mm. longis in sinubus insertis. *Ovarium* cum stylo glabrum, 6 mm. longum ; G. Don, Dict., IV., p. 65 ; A. DC. in DC. Prodr., IX., p. 15 (lit. cit.) ; Wight, Illustr., II., t. 156 ; Benth. in Journ. Linn. Soc., I., 103 ; C. B. Clarke in Hook. f. Flor. Brit. Ind , IV., p. 90 (lit. cit.) ; Kurz, For. Flor. II., p. 167 ; Cooke, Fl. Bombay, II., p. 186 ; Dalz. and Gibs, Bombay Flora, p. 156 ; Wall. Fl. Ind., II., p. 263 ; Roxb., Fl. Ind., I., p. 576 ; Thwaites, Enum. Plant. Zeylan., p. 425 non p. 201 ; Trimen, Fl. Ceylon, Pt. III., p. 176 ; Brandis, Indian Trees, p. 474 ; Dop in Bull. Soc. Bot. Fr., LVII., Mém. 19 (1910), p. 18 ; Bourdillon, Forest Trees, Travancore, p. 270.

" Ceylon. Doonbera ; Trincomalee, *Glenie* C. P. 3719 ; without locality, Koenig in Herb. Mus. Brit.

" S. India. Deccan peninsula ; Mysore to Chotanagpur ; numerous collectors.

" Burma. Prome Hills, *Wallich* 1585 ; Pegu, Prome, Kurz 2320 ; Prome, Burkill 23819 in Herb. R. E. P.

" The inflorescences are borne at the end of short, leafy, axillary shoots. The long flowers resemble externally those of the long-tubed species, but the corolla lobes are almost equal in length to the tube. The mature leaves are quintuplinerved and easily recognized from those of any other Eastern species. Some specimens from Courtallum in Herb. Wight (1836, No. 639) at Glasgow have obovate leaves cuneate at the base, and the twigs are unusually slender. The tree is characteristic of the dry regions of India and Ceylon, and the only record of its occurrence in Burma is from the Prome Hills, where conditions resemble those of the drier parts of India. As the tree bears no native Burmese name, it seems possible that it may have been introduced from India.

"The Burma material is very poor, no flowers being present, but the seed appears to be rather larger than in the Indian specimens. Kurz's description also differs slightly from that given in the Flora of British India.

"**S. coriacea** Thwaites, Enum. Plant. Zeyl., p. 425; descr. ampl.

Frutex ramulis junioribus pubescentibus. *Folia* ovato—vel elliptico—lanceolata, acuta vel breviter acuminata, coriacea, 6–6·5 cm. longa, circiter 3 cm. lata, marginibus paullo reflexis, subtriplinervia, nervibus crassis, petiolis, 2 mm. longis hirsutis. *Inflorescentiæ* axillares, crassæ, 3·5–4 cm. longæ, pedunculis pedicellisque pubescentibus. *Calyx* 1·5 mm. longus; segmenta late ovata, subacuta, marginibus ciliatis. *Corolla* 6 mm. longa, externe puberula, lobis 3 mm. longis interne totius cum corolla ad faucem dense laneo-tomentosis, pilis longis intertextis, tubo glabro. *Antheræ* 1·25 mm. longæ, ellipticæ, glabræ, filamentis crassis 1·5 mm. longis. *Ovarium* cum stylo 4·5 mm. longum, pilis erectis instructum. *S. Beddomei* var. *coriacea* C. B. Clarke in Hook. f. Flor. Brit. Ind., IV., p. 89; Trimen, Fl. Ceylon, Pt. III., p. 173. *S. potatorum* Thwaites, Enum., p. 201 partim.

"Ceylon. Central Province, Thwaites 3,367.

"In its pubescent stems and petioles, leathery, shortly petioled, subtriplinerved leaves, puberulous corolla with lobes densely hairy from base to apex, this plant appears to be worthy of specific rank. I have therefore followed Thwaites and also prepared a more ample description. According to Trimen, its habitat is the Central Province of the Island, which suggests that it is a truly endemic species. It is unfortunate that it is represented at Kew and the British Museum by only single specimens, and that no fruits have been collected."

"**S. micrantha** Thwaites, Enum. Plant. Zeyl., p. 425 partim, C. P. 1866 excl.; C. B. Clarke in Hook. f. Fl. Brit. Ind., IV., p. 86 partim, sed ovarium hirsutum nec glabrum; Trimen, Fl. Ceylon, Pt. III., p. 172 partim, C. P. 1866 excl.; Dop in

Bull. Soc. Bot. Fr., LVII., Mém. 19 (1910), p. 14, var. excl. "*S. colubrina et S. Beddomei*, Brandis, Indian Trees, p. 474 partim, quoad spec. Zeylan. tantum. *S. laurina* Thwaites, Enum., p. 201. *S. Beddomei* Trimen, Fl. Ceylon, Pt. III., p. 173, var. excl.

Ceylon. Trincomalee and Central Province, up to 600 m., *Thwaites* C. P. 3720 (3720 A. in Herb. Kew); Thwaites 3540.

"The corolla is about 4 mm. long, the lobes and tube being equal in length. The lobes in the lower part and the throat bear scattered woolly hairs. The ovary is hairy as described by Thwaites.

"*S. micrantha* is very closely allied to *S. colubrina* from the western side of the Indian Peninsula, and its flowers especially resemble those of the specimens from Travancore. The usually narrowly-elliptic, lanceolate, acuminate leaves, and the corolla with lobes equal in length to the tube serve as a means of recognizing the Ceylon specimens. *S. micrantha* may be regarded as the Ceylon representative of *S. colubrina*, and both no doubt must be reckoned among the plants long known as 'lignum colubrinum.'

"It is very unfortunate that *S. micrantha* is not represented by fruits in our herbaria. The fruiting specimens assigned to it have been found to belong to *S. lenticellata* A. W. Hill. On the sheets of Thwaites 3720 and 3540 at Kew portions of fruiting specimens have been attached, which are identical with Thwaites 1866 excluded by me from *S. micrantha*. These and No. 1866 agree so closely with *S. lenticellata* from S. E. India that they have been referred to that species. Specimens in the Wallichian Herbarium under the label 'Ceylon 96 and Palamcottah 95' collected by Rottler in 1795 and 1796 have also been referred to *S. lenticellata*."

"**S. lenticellata** A. W. Hill; species ex affinitate *S. colubrinæ* Linn., et *S. micranthæ* Thw., sed ramis lenticellis conspicue instructis, foliis triplinerviis minoribus, segmentis calycis angustioribus, antheris orbicularibus distincta.

"*Frutex* scandens, ramis et ramulis striatis lenticellis insigniter instructis, cirrhis bijugis glabris. *Folia* obovata vel elliptico-obovata, basi et versus apicem cuneata, acuta

vel subacuta, mucronulata, aliquando retusa, 5–7 cm. longa, 2 cm. lata, glabra, superne vernicosa, triplinervia, venis nervisque prominentibus; petioli 5 mm. longi, e basi tumido orti. *Inflorescentiæ* axillares, multifloræ, circiter 3 cm. longæ; pedunculis et pedicellis pubescentibus. *Calyx* 1·25–1·5 mm. longus, segmentis anguste ovatis vel ellipticis subacutis subglabris vel pubescentibus marginibus hirsutis. *Corolla* 3·5–4 mm. longa, lobis repandis 2–2·5 mm. longis ovato-lanceolatis subacutis parti inferiore pilis laneis sparsis instructis tubo glabro. *Antheræ* orbiculares, 0·65 mm. diametro, filamentis 1–1·25 mm. longis. *Ovarium* cum stylo 3 mm. longum, hirsutum, ovario apice præcipue pilis erectis instructo. *Fructus* globosus, circiter 2 cm. diametro, 1–2-spermus; pericarpium crustaceum. *Semen* orbiculare, 1·4 cm. diametro, planum, circiter 2 mm. crassum, glabrum. *S. potatorum* Thwaites, Enum., p 201 quoad C. P. 1866. *S. micrantha* Thwaites, Enum., p. 425 et Trimen, Flor. Ceylon, Pt. III., p. 172 quoad C. P. 1866.

"Vern. Name: Cheroomolaghoo, according to a label on a specimen, dated 1828, in Herb. Wight preserved in the University Herbarium, Glasgow.

"S. India. Madras: Cuddapah Hill (7/81), *Beddome* 6, 5305 in Herb. Mus. Brit.; Madras, without precise locality, *Wight & Heyn* (*Wallich* 1589 b. in Herb. Heyn); Negapatam, *Herb. Wight*; Kurnool Hills, *Beddome* (1878); Palamcottah (1795), *Rottler* 30 *Wallich* 1585 b. (Herb. Klein ?) in Herb. Wall.; Chingleput Dist.; Kambakkam Droog, *Bourne* 2533; Kambakkam Hills (May, 1913, fruit), *Barber* 8862 in Coimbatore Coll. Herb.; Kouri Kandjera, *Leschenault* in Herb. Mus. Paris.

"Ceylon. *Rottler* 1796; *Wallich* 1585 b. in Herb. Wall.; without precise locality, *Thwaites* 1866; also fruiting specimens attached to sheets of *Thwaites* 3720, 3540 in Herb. Kew; fruits (labelled "near *axillaris*") Colombo, *Ferguson* in Mus. Kew.

"A very distinct species with its stems closely covered by conspicuous lenticels. The triplinerved leaves are relatively small and uniform in size, tapering regularly towards base and apex. In the flowers the orbicular anthers afford a

useful character for distinguishing the species, and the calyx segments are much narrower than is common in allied species.

" Wight on his label when sending the plant to Sir W. Hooker under the name *S. colubrina* (?) suggests that it is a new species, since Willdenow in contradiction to Indian botanists said it was not *S. Nux-vomica*. Specimens collected by Rottler at Palamcottah in 1795 and Ceylon 1796, and placed by Wallich under his number 1585 with *S. potatorum*, also belong to this species.

" Some references to the Ceylon specimens will be found in the notes under *S. micrantha* Thw. There is a bottle of ripe fruits with two leaves in fluid in the Kew Museum bearing the label '*Strychnos* near *axillaris*, Colombo, W. Ferguson,' which apparently belong to *S. lenticellata*. They are about 2 cm. in diameter, 2-seeded, with a fleshy pericarp 5 mm. thick.

" It is unfortunate that Thwaites gave no exact localities with his specimens. Trimen, under *S. micrantha* (with which *S. lenticellata* is included), gives ' Low-country ' as the habitat, and mentions Peradeniya, Galle, and Trincomalee as localities. Whether these all refer to Thwaites 1866 as well as to the true *S. micrantha* is uncertain.

" Judging from the localities in which the Indian specimens have been collected, *S. lenticellata* is a dry country plant, and it would be likely to occur in similar situations in Ceylon, and therefore in the northern drier portion of the Island, which is in all essentials a part of India."

" **S. Benthami** C. B. Clarke in Hook. f. Flor. Brit. Ind., IV., p. 87 ; descr. emend. et ampl.

" *Caules* quadrangulares, pubescentes. *Folia* ovato-lanceolata, acuta vel acuminata, versus basin plus minusve cuneata vel rotundato-cuneata, 5·5–7·5 cm. longa, 2·5–3·5 cm. lata, superne glabra, pagina inferiore nervo medio hirsuto, 5 nervia, plus minusve triplinervia, nervis intermediis curvatis ; petioli 2–3 mm. longi, pubescentes. *Inflorescentiæ* axillares, paucifloræ, 5–8 mm. longæ ; pedunculis pedicellisque pubescentibus. *Calyx* segmenta 4, lanceolato-subulata, breviter acuta,

marginibus breviter ciliatis, intus glabra. *Corolla* 2·5–2·75 mm. longa, lobis 4 crassis 1·5–1·75 mm. longis medio linea pilorum notatis. *Antheræ* 0·75 mm. longæ, apiculatæ, in sinubus insertæ, basi barbatæ. *Ovarium* cum stylo glabrum, 1·5 mm. longum. *Bacca* circiter 1 cm. diametro; pericarpium crustaceum. Dop in Bull. Soc. Bot. Fr., LVII., Mém. 19 (1910), p. 15; Trimen, Fl. Ceylon, Pt. III., p. 174; *S. minor* Benth. (non Blume) et var. *ovata* Benth. in Journ. Linn. Soc., I., p. 100; *S. minor* Thwaites (non Blume) in Enum. Plant. Zeylan., p. 201.

"Ceylon. Colombo (1860), *Thwaites* 187; without precise locality, *Mrs. General Walker*; *Col. Walker* 244; *J. S. Mackenzie*; *Dr. Kelaart*.

"The specimens under the name *S. colubrina*, Ind. Orient. Herb. D. van Royen et herb. Koenig in Herb. Mus. Brit. apparently belong to *S. Benthami*.

"Var. *parvifolia* Benth. in Journ. Linn. Soc., I., p. 101.

"*Folia* ovata, coriacea, marginibus reflexis, 2–2·5 cm. longa, 1–1·8 cm. lata. *Inflorescentiæ* pauciforæ, pleræque terminales. *S. Benthami* C. B. Clarke var. *parvifolia* Benth., C. B. Clarke in Hook. f. Flor. Brit. Ind., IV., p. 87; Trimen Fl. Ceylon, Pt. III., p. 174; Dop l. c., p. 15.

"Ceylon. Adam's Peak (1846), *Thwaites* 341; *Gardner* 580.

"Var. *angustior* Benth. in Journ. Linn. Soc., I., p. 101.

"*Folia* anguste ovato-lanceolata, acuminata, 3·5–6 cm. longa, 1·1–2 cm. lata, basi anguste cuneata. *Inflorescentiæ* pleræque axillares. Trimen, Fl. Ceylon, Pt. III., p. 174. *S. minor* Benth. var. *parvifolia* Thwaites, Enum. p. 201.

Ceylon. Matelli East (1863), *Thwaites* 341; Balangoda (1846), *Thwaites* 187.

"*S. Benthami*, with two of its varieties, *parvifolia* and *angustior*, as distinguished by Bentham, is distinct from other species in having a 4-merous corolla and calyx. The young twigs, leaf petioles, and the back of the midrib are pubescent. The variety *ovata* of Bentham is not maintained, as there is no good character to distinguish it from the type. Bentham's variety *nitida* with its 5-merous flowers, calyx hairy within, rhomboid leaves, &c., has been described as a new species under the name *S. trichocalyx* A. W. Hill."

" **S. trichocalyx** A. W. Hill ; species *S. Dalzellii* C. B. Clarke, calyce intus hirsuto affinis, sed foliis rhomboideis basi cuneatis floribus minoribus præcipue differt.

" *Frutex* scandens (?). *Caules* in juventute pubescentes striati, sub-quadrangulares. Folia obovata vel rhomboidea, versus apicem cuneata, acuta vel acuminata, basi cuneata in petiolis angustata, 5–7·5 cm. longa, 3–5 cm. lata, coriacea, superne vernicosa et glabra, marginibus paullo reflexis, pagina inferiore in angulis nervorum sæpius hirsuta, 5-nervia, triplinervia, nervis intermediis rectis non curvatis cum nervo medio acutangulos facientibus ; petioli 0·5–1 cm. longi, glabri ; cirrhi simplices. *Inflorescentiæ* axillares, 1–1·5 cm. longæ, congestæ, pedunculis pedicellisque pubescentibus. *Calycis* segmenta 5, subrotunda, marginibus ciliatis intus ad basin pilis erectis lineatim instructis. *Corolla* 3·5 mm. longa, 5-loba, lobis 2·5 mm. longis ellipticis subacutis crassis, intus supra medium linea pilorum notatis. *Antheræ* 0·75–1 mm. longæ, orbiculari-ovatæ, ad basin et paullo ad margines conspicue barbatæ. *Ovarium* cum stylo glabrum, 1·75–2 mm. longum. *Bacca* globoso-ovoidea, circiter 1·5 cm. longa, 1–2 sperma ; pericarpium crustaceum. *S. minor* Benth. var. *nitida* Benth. in Journ. Linn. Soc., I., p. 101 (non *S. minor* Blume). *S. colubrina* Thwaites, Enum. Plant. Zeyl., p. 201, non Linn. ; *S. colubrina* var. *zeylanica* Clarke in Hook. f. Flor. Brit. India, IV., p. 87 ; Trimen, Flor. Ceylon, III., p. 173. *S. micrantha* var. *rhomboidalis* Dop in Bull. Soc. Bot. Fr., LVII., Mém. 19 (1910), p. 14, quoad spec. Zeylan. tantum.

" Ceylon. Galagoma, *Thwaites* 330 ; without precise locality, *Thwaites* 2516 ; *Col. Walker* in Herb. Wight ; *Mrs. Genl. Walker* in Herb. Hook. (in Herb. Kew) ; Kandy, *A. Moon* 346 ; without locality, *Macrae* 197 in Herb. Mus. Brit. ; Galle, *Pierre* (1865) in Herb. Mus. Paris.

" A striking species with its rhomboid leaves, conspicuously cuneate or acute towards both base and apex. The specimens at the British Museum have single tendrils so presumably the plant is scandent. It is distinguished from *S. Benthami* by the 5-merous flowers and by the irregular line of erect hairs springing from near the base of the inner surface of the calyx segments as well as by the leaves.

"Clarke placed this plant under *S. colubrina*, an unfortunate position since it differs from that species both in the character of the corolla hairs and also in its glabrous ovary. Dop, in pointing out the latter difference, places it as a variety *rhomboidalis* under *S. micrantha*, a distinct species with woolly corolla hairs; he also adds a plant from Cochin, which proves to be *S. Dalzellii*.

"The true alliance of this peculiar Ceylon species is no doubt with *S. Dalzellii* Clarke, from S. India, for not only is there some general similarity in the foliage, but the line of internal calyx hairs is found in both species—a feature not seen in any other eastern species of *Strychnos*; in the corolla there is also close resemblance.

"According to Trimen, this plant is rather common in the dry and intermediate regions of Ceylon.

"Attached to the Pierre specimen at Paris is a beautiful series of drawings by E. Delpy (1903) showing the internal calyx hairs of this species."

"**S. Nux-vomica** Linn. Spec. 271; G. Don, Dict., IV., p. 65; Clarke in Hook. f. Flor. Brit. Ind., IV., p. 90—syn. Kurz, For. Flor., II., p. 166, *S. lucida* Wall. Cat. 1590 et loc. Tenasserim excl.; Bedd. Fl. Sylv., II., t. 243 et Brandis, Indian Trees, p. 473, spec. Burm. excl.; Trimen, Fl. Ceylon, Pt. III., p. 175; Dalz. & Gibs. Bombay Flora, p. 155; Benth. in Proc. Linn. Soc., I., p. 103, spec. ex Moluccis excl.; Miq. Flor. Ned. Ind., II., p. 378 partim; Cooke Fl. Bombay, II. p. 185; Dunstan & Short, Pharm. Journ. XV., ser. III., p. 1 et Icon.; Dop in Bull. Soc. Bot. Fr., LVII., Mém. 19 (1910), p. 18 spec. Birman. *Anderson*, *Pierre* 3693 et var. *grandiflora* excl.; Dop in Lecomte, Flor. Gén. Ind. Chin., IV., p. 168 spec. Siam., spec. *Pierre* (sub var. *oligosperma*), et var. *grandiflora* excl.; Bourdillon, Forest Trees Travancore, p. 269; non Kurz, For. Fl. Brit. Burma, II., p. 166; non Craib in Kew Bull. 1911, p. 421. *S. Nux-vomica* var. *oligosperma* Dop in Bull. Soc. Bot. Fr., LVII. Mém. 19, p. 18 et in Lecomte, Flor. Gén. Ind.-Chin., IV., p. 169 spec. *Pierre* excl.

"India. Madras; Travancore; Bengal.

"Ceylon.

"Indo-China. Cochin-China: *Pierre* 3689; *Lefèvre* 385; *Thorel* 1026 in Herb. Mus. Paris; *Jumelle* (semina) in Herb. Kew. Cambodia spec. ex *Jumelle* in Herb. Kew. Laos: *Thorel* in Herb. Mus. Paris.

"An examination of the rich material of *S. Nux-vomica* from Calcutta brought to light the interesting fact that *S. Nux-vomica* Linn. is confined to India and Ceylon, and that the Burmese plant hitherto referred to this species is quite distinct.

"The fruit of the true *S. Nux-vomica* varies in size from that of a large to a small orange, according to Dunstan & Short l.c. A diameter of 5·6 cm. appears to be exceptional, and more usually they are about 3·5–4 cm. in diameter. The number and size of the seeds is also variable, 4 being the average number of good seeds. The circular button-like seeds with their satiny coats are easily distinguished from those of *S. Nux-blanda*."

"**S. cinnamomifolia** Thwaites, Enum. Plant. Zeylan., p. 201; descr. emend. et ampl.

"*Folia* ovato-vel elliptico-lanceolata, apice sensim acuminata vel acuta, basi cuneata, rarius rotundato-cuneata, 8–9·5 cm. longa, 3·5–4 cm. lata, triplinervia, venis approximatis. *Inflorescentiæ* sublaxæ, pedicellis ferrugineo-pubescentibus. *Calyx* 1·5-2 mm. longus; segmenta late ovata, subacuta vel acuta, minute ferrugineo-pubescentia. *Corolla* 1·4 cm. longa, lobis circiter 4 mm. longis. *Antheræ* 1·5–1·75 mm. longæ, apiculatæ. *Fructus* globoso-ovoideus, 6·5–9 cm. longus, 5–7·8 cm. latus; pericarpium lignosum, 6–7 mm. crassum, lævc, vernicosum. *Semina* 8–15, irregulariter elliptica vel orbiculari-elliptica, 2–3 cm. longa, 1·3–2·4 cm. lata, subcompressa, circiter 1 cm. crassa, sub-biconvexa, pilis sericeo-laneis dense vestita, plerumque margine incrassato circumcincta; C. B. Clarke in Hook. f. Flor. Brit. Ind., IV., p. 89 syn. excl.; Trimen, Fl. Ceylon, Pt. III., p. 174.

"Ceylon. Hantani District, moist low-country; 600–900 m., Thwaites 1867; without locality, *Gardner* 578; *Walker;*

seeds (Eta-Kiunda-wel) Col. Ind. Exhib. 171, 1886 in Mus. Kew (Eta-Kirindi-wel, *Trimen*); fruits and seeds, *Petch* (recd. 1917).

. . . . . .

"The seeds of the type which have recently been received at Kew through the kind offices of Mr. T. Petch are rather larger and thicker than those from Travancore, and are unusually biconvex and about 1 cm. thick. The wall of the fresh fruit is 6–7 mm. thick, and the seeds are embedded in a solid fleshy pulp. The seeds show a distinct marginal border, and have a dense felt-like covering of short hairs, which do not show the satiny lustre of those on the seeds of *S. Nux-vomica*. Prof. Greenish, who has kindly analyzed the seeds, informs me that they contain 2·07 per cent. of alkaloid, which is brucine, the percentage of strychnine being very small. The species may be distinguished principally by its leaves, which are markedly cuneate at the base.

. . . . . .

"It seems better to refer the Indian specimens of *S. cinnamomifolia* to a variety, since they differ from the Ceylon plant in having broader leaves with more rounded bases and somewhat different seeds.

"The resemblance between this species and *S. Nux-vomica* is considerable, but the latter being a tree with different leaves, fruits, and seeds, can easily be distinguished from the huge climbing plant."

[Note on the above.—T. P.]

It will be evident that further details are required concerning *S. tetragona*, *S. coriacea*, and *S. micrantha*. The varieties of *S. Benthami* might also repay attention; the inclusion of the common up-country var. *parvifolia* with the low-country *S. Benthami* always startles the novice in Ceylon botany, and var. *angustior* is little known.

The specimens in Herb. Peradeniya include the following which are cited here as they stand in the herbarium covers; the numbers in parentheses indicate the separate sheets :—

S. micrantha Thw. (1) C. P. 3720, without locality, two specimens, labelled *S. micrantha* Thw. (2) C. P. 3540,

originally labelled *Strychnos laurina* Wall., now labelled *S. micrantha* Thw., *S. Beddomei* Clarke, five specimens, marked "near Galle, Sept., 1857. Bibile, Feb., 1858"; a note near one specimen reads "a tree." All the foregoing are *S. micrantha ;* the ovary is villous, chiefly above, and the twigs are strongly lenticellate. (3) C. P. 3720, labelled *Strychnos micrantha* Thw., three specimens, marked "Between Ratnapura and Galle, March, 1861 ; Peradeniya, March, 1863" ; one of these is *S. micrantha ;* the other two are *S. tetragona ;* the latter are small, one bearing only an inflorescence, and the other two inflorescences and three leaves, which are ovate, acuminate, or obtuse, not rounded at the base, minutely pubescent on both surfaces ; the ovary of *S. tetragona* appears lobed when soaked in dilute potash. (4) C. P. 1866 and C. P. 3540, originally labelled *Strychnos laurina*, now labelled "*S. Beddomei* Clarke quoad C. P. 3540 (Fl. Brit. Ind.), *S. micrantha* Thw., quoad C. P. 1866 (Fl. Brit. Ind.)" ; according to a note on sheet (3), C. P. 1866 was transferred here from that sheet by Trimen ; there are four fruiting specimens, two each of apparently different species. C. P. 1866 is marked "Kurunegala, July, 1853," C. P. 3540 was gathered "near Galle, *Capt. Champion,* before 1857" ; Hill takes all (?) these fruiting specimens as *S. lenticellata*, but this point will be referred to again below. (5) A sheet, labelled *S. micrantha* by Trimen, collected by H. Nevill, Sober Island, Trincomalee, March, 1892 ; this is a doubtful specimen ; it is marked "a creeper" by Nevill ; the ovary is that of *S. micrantha*, but no corollas are available, and the habit appears different.

S. coriacea Thw. Under *S. Beddomei* Clarke var. *coriacea* is C. P. 3367, Central Province, February, 1855. There are also two sheets, collected by Trimen at Rasagala, Balangoda, in September, 1895, which show both flowers and fruits. The leaves of these latter specimens are identical with those of the specimens with the larger fruits in C. P. 3540 (not C. P. 1866) ; they are usually rounded at the base, ovate-lanceolate with long acuminate tips, up to 9 cm. long, 2·5–3·5 cm. broad ; as a rule, the leaves are glabrous, but a few minute hairs may be found in some cases on the under surface along the veins ; the fruits have been pressed, but they appear to have been at least

2·5 cm. in diameter, with a thinner wall than those of C. P. 3540; the flower is that of *S. tetragona*; the shape of the leaf is that of *S. potatorum* in C. P. 3719, but the venation is different.

These Rasagala specimens appear to be *S. tetragona*, but if so, the shape of the leaf in that species is highly variable. The fruiting specimens in C. P. 3540 would then also be *S. tetragona*. In that case the leaves of *S. tetragona* are finely pubescent on both surfaces at first, becoming glabrous.

The fruiting specimens, C. P. 1866, have small, globose, or slightly ovoid fruits, 0·7–1 cm. diameter, apiculate with the remains of the style. Numerous fruits develop from a single inflorescence. The leaves are elliptic, cuneate at the base, obtuse and sometimes incised at the apex, triplinerved, small, the largest 4·5 cm. long and 2·5 cm. broad. The panicles are leafy. The leaves are now glabrous, but there are slight indications that they may originally have been pubescent on the upper surface. The identity of these specimens is doubtful, but if they are considered identical with the fruiting specimens of C. P. 3540, they must go under *S. tetragona*.

S. potatorum Linn. f. The sheets in Herb. Peradeniya are (1) C. P. 3719, no locality, two sheets; (2) C. P. 3719, Dambool, Nov., 1858, *Morris* (?); Trincomalee, 1861, *Glenie;* and (3) a fruiting specimen, Ooma-oya, June, 1881, *Trimen.*

S. Benthami Clarke. The type is represented by (1) C. P. 187, Balangoda and Kalutara, *Gardner;* Saffragam, Nov., 1866; (2) C. P. 187, Colombo; and (3) Ellabodakanda, Kukulu korale, 1919. Of var. *parvifolia*, there are (1) C. P. 341, Adam's Peak, *Gardner;* Hunasgiriya, April, 1851; Elk Plains, Sept. 1851; (2) C. P. 341, Maturata, Sept., 1851 (No. 122); (3) C. P. 341, Maturata, Nov., 1851; Dimbula, April, 1852; (4) Nilumalle, Madulkele, Oct., 1887, *Trimen;* (5) Rangala, Sept., 1888, *Trimen;* (6) Warriagala, Hantane, Dec., 1889, *Trimen;* (7) Hakgala, April, 1906, *Smith* (two sheets); (8) between Hakgala and Fort Macdonald, April, 1906, *Smith* (aff. *parvifolia*); (9) Hakgala, May, 1911. Var. *angustior* is represented by (1) specimens in C. P. 341, Matale East, June, 1863; (2) Nitre Cave, Sept., 1888, *Trimen;* (3) a specimen from Haputale, *Smith*, 1906, approaching var. *angustior*, but scarcely in a fit

condition for determination. The specimen C. P. 187, Balangoda, is assigned to var. *angustior* by Hill, but to the type by Trimen ; the specimens from Ellabodakanda have long, narrow leaves, and might equally be placed as *angustior*. But Thwaites's and Trimen's var. *angustior*, from Matale East and Nitre Cave respectively (both the same district), has a somewhat elongated lozenge-shaped leaf.

From the herbarium specimens the type form is found in the moist low-country, Colombo to Galle ; var. *parvifolia* is an up-country species common in the higher jungles ; while var. *angustior* is known with certainty only from the Nitre Cave district.

Strychnos trichocalyx A. W. Hill. In the cover of *S. colubrina* in Herb. Peradeniya are (1) C. P. 2516, without locality ; (2) C. P. 2516, marked Galagama, *Gardner ;* and Haragam, &c. ; (3) C. P. 2516, Anuradhapura, *Brodie ;* and Haragam, June, 1853, April, 1854 ; (4) Dambool, July, 1887, *Trimen* (leaves only) ; (5) Nilgala Hill, Uva, Jan., 1888, *Trimen*.

Sheet (1) is *S. trichocalyx ;* the calyx hairs are well developed, and the leaves rhomboidal, with a dense tuft of tomentum in the axils of uppermost pair of veins ; the leaves when dry are mottled green and black on the upper surface. Sheet (2) is *S. trichocalyx* as to one specimen, but the other two pieces are somewhat different, and sheet (3) has the same mixture. Sheet (5) is identical with the second specimens on sheet (2). These latter specimens have ovate-lanceolate leaves, acuminate, tapering gradually at the base, 7·5 × 3·3 cm., 5-nerved, glabrous beneath ; the flower resembles that of *S. trichocalyx*, but the calyx is shallower and has more rounded lobes, and the line of hairs on the inner side of the calyx lobes is variable, being fairly well developed in some flowers and almost absent in others. As far as the C. P. numbers are concerned, this is probably the plant collected at Haragama, which is not cited by Hill.

S. Nux-vomica Linn. The few specimens of this common species in Herb. Peradeniya are (1) C. P. 2839, Anuradhapura, *Brodie ;* Kurunegala, June, 1853 ; Trincomalee, Aug., 1859, *S. O. Glenie ;* and (2) C. P. 2839, Trincomalee, Aug. 1859, *S. O. Glenie*.

S. cinnamomifolia Thw. In Herb. Peradeniya are (1) C. P. 1867, Hantane, 1859; and (2) C. P. 1867, Galle, *Capt. Champion*; Hantane, &c., *Gardner*. It is known to occur at Henaratgoda.

(6) Hutchinson J. Cordia Myxa and Allied Species. Kew Bulletin, 1918, pp. 217–222.

The author has made a critical examination of the Kew herbarium specimens attributed to *Cordia Myxa*, and has come to the conclusion that the true *Cordia Myxa* L. is in all probability confined to Asia Minor and Egypt, where it is mostly found in cultivation. The plant attributed to this species in India and Ceylon is *Cordia obliqua* Willd.

Cordia Myxa has "Stylo arms short and broad, expanded fanwise towards the apex and with lobulate margins; leaves always more or less orbicular, entire or obscurely repand in the upper parts, always lightly covered all over the lower surface with white, short, setulose hairs, flabellately 5–7-nerved from the base; anther filaments nearly glabrous from the base."

Cordia obliqua has "Style arms long and slender and only sometimes slightly expanded at the apex; leaves variable, but usually penninerved at the base, if hairy, then the hairs fairly long and mainly in the axils of the nerves and near the midrib; anther filaments rather densely setose-pilose towards the base."

The following synonymy is given :—

"*Cordia obliqua* Willd. Phytogr. 4, t. IV. (1794); Sp. Pl., I. (1797); DC. Prodr., IX., 479 (1845); C. B. Clarke in Hook. f. Fl. Brit. Ind., IV., 137, excl. var. (1883); Watt, Dict. Econ. Prod. Ind., II., 565. *C. indica* Lam. Dict., VII., 49 (1806); DC. l.c. 500. *C. latifolia* Roxb. Fl. Ind. ed. Car. & Wall., II., 330 (1824); Dalz. et Gibs. Bomb. Fl. 173. *C. Myxa* Roxb., l.c. 332; Wall. Cat. 889; Wight, Ill., t. 169; Dalz. et Gibs. l.c.; Benth. Fl. Austral., IV., 386; Bedd. For. Man. 165, et Fl. Sylv. t. 245, fig. A; Brand. For. Fl. 336; Kurz, For. Fl., II, 208; Thwaites, Enum. 214; C. B. Clarke l.c. excl. var.; Watt, l.c. 563; Gamble, Man. Ind. Timb., 500-501; Merrill, Interp. Rumph. Herb. Amboin. 447 (1917); non. Linn. Vidi-maram,

Rheede, Hort. Malab., IV., t. 37. For further references to literature and detailed information as to native names and uses, see Watt, ll.cc.

" Widely spread over nearly the whole of the warmer parts of India and Ceylon (often cultivated), Malacca, Indo-China, Hainan, Formosa, Java, Philippines (*C. Blancoi* Vidal), New Guinea, and tropical Australia.

" Vernacular name of the fruit in India *Lasora ;* known to Anglo-Indians as *Sebesten.*"

(7) Sprague, T. A. Dolichandrone and Markhamia. Kew Bulletin, 1919, pp. 302–314.

Dolichandrone Rheedii Seem. should be *Dolichandrone spathacea* K. Schum. [Trimen notes (III., 283) that Ceylon specimens from Koenig in Herb. Brit. Mus. are the type of *Bignonia spathacea* L. f.—*Ed.*]

(8) Valeton, Th. New Notes on the Zingiberaceæ of Java and the Malayan Archipelago. Bull. Jard. Bot. Buitenzorg, 2nd ser., No. XXVII.

Valeton, in the course of his investigations into the Zingiberaceæ of Java and Malaya, has examined material of two Ceylon species, viz., *Zingiber Zerumbet* Sm., and the common Turmeric, supplied from Ceylon. Ceylon is the type locality for *Zingiber Zerumbet*, as the species was founded by Linnæus (*Amomum Zerumbet* Linn.) on Hermann's specimen. Valeton finds that *Zingiber Zerumbet* is not the same as *Zingiber amaricans* Bl., as it was thought to be by Schumann, who worked with dried specimens.

With reference to the Turmeric, Valeton's conclusions are of great interest. The accepted name of the common Turmeric has been *Curcuma longa* L. That name, according to Valeton, was based on a species described by Hermann (Hort. Acad. Lugd. Bat. (1687), p. 208, cum tab.). Hermann stated that he had brought the plant from the East, and that it was in the Leyden Botanic Garden at the time he wrote. Presumably he obtained it in Ceylon. According to Hermann's description,

Curcuma longa L. has bracts pale green, then yellow-reddish or pale yellow, and flowers pale yellow or purple-red. Moreover, he describes and figures a species with a lateral inflorescence.

Roxburgh took as *Curcuma longa* the species described by Koenig. Koenig's description in Retz. Obs. (1783), III., 72, calls for a species with a central inflorescence, white bracts, and a white flower, with a median longitudinal yellow stripe on the lip.

Valeton finds that the Ceylon Turmeric is the same as the species grown in Java and Malacca, and apparently also in Cochin-China. This has a central inflorescence. The bracts are pale green, often with a few longitudinal white stripes or bordered with white, while a few of the coma bracts are wholly white. The flower is creamy white, with a yellow median stripe on the lip. He has described it under the name of *Curcuma domestica* Val., and regards it as identical with *Curcuma longa* Koen. (non Linn.), and the *Curcuma domestica minor* of Rumphius.

The rhizomes supplied to Dr. Valeton from Ceylon were obtained from a village cultivator, and there is, therefore, no doubt that *Curcuma domestica* Val. is cultivated as Turmeric in Ceylon. Furthermore, plants in flower have recently been obtained from two native gardens in Ceylon and from the Experiment Station, Anuradhapura (1919), and these answer to the description of *Curcuma domestica*. In these latter specimens, however, the coma bracts, especially the uppermost, bear very minute purple-red spots, only distinguishable as spots with a lens, on the upper part of the bract, and chiefly towards the margin, so that the uppermost coma bracts are slightly tinged with purple at the edges.

Hermann described the plant of Hort. Acad. Lugd. Bat., p. 208, as having a terete rhizome, with concentric zones, yellow within, inclining to purple (puniceus) when old; his figure shows a more regular rhizome than is usual in Turmeric. The leaves were light green, acuminate. The flowering stalk arose from the rhizome at some distance from the leafy stem, and was naked below. The bracts were pale green at first, afterwards "ex flavo rubentia vel ex pallido flava,"

re-curved and mucronate at the apex. Hermann stated that the pockets formed by the bracts contained a "tenax et viscosus humor, collectus ex nocturno deciduo rore." Grimm made a similar statement concerning *Alpinia Galánga*, but it is no doubt equally applicable to all inflorescences of this type. The flowers had four petals, most usually pale yellow or purplish, and the lip was twisted and fimbriate (intorto et fimbriato). The fruit capsule was membranous, trilocular, with globose fuscous seeds, smaller than those of *Canna indica*.

Valeton takes the plant described above as *Curcuma longa* L., and lists it as an incompletely known species. But as far as specimens are concerned, *Curcuma longa* L. is the "Kaha. Curcumæ flos. Curcuma radice longa H. L. B." of Hermann, Mus. Zeyl., p. 30, and Linn., Flora Zeylanica, No. 7, the specimen of which was seen and examined by Linnæus. As Trimen pointed out (Jour. Linn. Soc., XXIV., p. 132), "it must be confessed that Linnæus has rendered some of his species obscure by erroneous synonymy; in working out the Flora Zeylanica he evidently endeavoured to embody as much as possible of what had been previously published of the plants of the East Indies generally; and he has not infrequently given under the Ceylon species synonyms and references which belong to quite different Indian or Javan plants. In most, though not all, of these cases I think it must be allowed that the Hermannian specimens should determine what was the plant intended by Linnæus rather than his book references." Hermann's specimen of *Curcuma longa* is still in existence. It was examined in 1857 by W. Ferguson, who passed it as the Ceylon Turmeric. Ferguson noted that only the flower (inflorescence) remained; but as Hermann described his specimen (in Mus. Zeyl.) as *Flos Curcumæ*, it may be doubted whether there was ever more than that. It was examined by Trimen in 1886, and enumerated by him without comment (*loc. cit.*). But it is remarkable that Trimen stated, in Flora of Ceylon, IV., p. 242, that Hermann's figure was a good figure of the Turmeric grown in native gardens in Ceylon, though it clearly shows a lateral inflorescence. There is a specimen of the Turmeric in the Peradeniya Herbarium collected by Thwaites and labelled *Curcuma longa* L.; it has a central inflorescence.

The discrepancy in Hermann's figure was noted by Commelinus, who, in Hortus Malabaricus, XI., p. 21, stated "Delineatio Do. Hermanni etiam deficit, et cum illa nostri authoris minime conveniens, præsertim in progressu floris."

Dryander (Trans. Linn. Soc., II., p. 212) wrote that the figure of a single flower given by Hermann "is exactly like that of Manja Kua in the Hortus Malabaricus, but it cannot be copied from thence, as Hermann's book was published before the eleventh volume of that work. I can no otherwise account for this similarity than by supposing that Hermann had seen the drawing before the publication. The reduced figure of the whole plant given by Hermann is also erroneous, representing the scapus at a distance from the leaves; whereas it appears by the accounts of the Hortus Malabaricus, Rumphius, Koenig, and Jacquin, that the scapus comes out between the leaves."

Hermann's figure of the flower of *Curcuma longa* is similar to that of Manja Kua, Hortus Malabaricus, XI., tab. 10, but one could scarcely maintain that it is a copy. Manja Kua is *Kæmpferia pandurata*.

The explanation of Hermann's mistake may possibly be that he gathered and pressed the flower of Kaha, and obtained rhizomes of Kaha later, shortly before his departure. The name Kaha merely means yellow; it is the common name of the Turmeric, but it is applied, with prefixes, to other plants, *e.g.*, *Curcuma Zeodaria* is Haran-kaha, and *Curcuma aromatica* is Wal-kaha or Dada-kaha. Moon obtained *Curcuma Zeodaria* as Kaha, and assumed it was *Curcuma longa* L. Nothing is more common than to be given the Sinhalese plant name without its prefix. But the name Kaha is not confined to plants of the genus *Curcuma;* it has been applied to *Bixa Orellana*.

At present it is not known what *Curcuma longa* L. is. Hermann's specimen may be the common Ceylon Turmeric, but the figure in Hort. Acad. Lugd. Bat. is not. The nearest approach to the latter known in Ceylon would appear to be *Curcuma aromatica* Salisb., which, though often cultivated, was not among Hermann's specimens. Hermann collected Haran-kaha, *Curcuma Zeodaria* Rosc., but the

specimen was lost before his herbarium came into the hands of Linnæus. His description of the colour of the flower of *Curcuma longa* may be partly from memory and partly from the plant grown at Leyden.

There is, however, another possible explanation of Hermann's description of the colour of the flower. The Ceylon specimens grown by Dr. Valeton had white bracts and cream-coloured flowers with a yellow median stripe, and flowering specimens of Turmeric from three localities in Ceylon agree with that, with the addition that there is a very obscure purple flush at the edges of some of the bracts. But in another specimen obtained from a native garden as Kaha, the bracts are white, with purple or reddish-purple tips, the colour becoming more pronounced on the uppermost bracts. Unfortunately the flowers in this specimen were not sufficiently developed for determination ; they appeared to be purple. Thus, it is probable that more than one species is cultivated as Turmeric in Ceylon, and Hermann's description of the colour of the flowers may refer to two species cultivated as Kaha. That *Curcuma domestica* Val. is so cultivated is certain, but that fact does not close the subject. The flower of the species with purple bracts was central, so it affords no assistance as regards Hermann's figure.

The following papers are not recent, but they have not hitherto been taken into account by Ceylon botanists :—

(9) Prain, D. Some Additional Species of Convolvulaceae. Jour. Asiatic Soc., Bengal, LXIII., Pt. II., pp. 83–115 (1894).

The following extracts refer to Ceylon species :—

Rivea ornata Choisy var. *typica*. Ceylon, in the hotter parts of the Island. " There is nothing to add to Mr. Clarke's excellent description of this plant, which, as he remarks, appears strictly confined to South India and Ceylon."

Ipomœa glaberrima Boj.; *I. grandiflora* C. B. Clarke, in Flor. Brit. Ind., IV., 198, not of Lamk. Ceylon at Dichwale [Dikwella—*Ed.*], close to the sea, *Thwaites* C. P. 3536. [See Flora of Ceylon, III., p. 214.]

Ipomœa campanulata Linn. var. *illustris*. Ceylon, *Thwaites*.

(10) Prain, D. Some Additional Leguminosae. Jour. Asiatic Soc., Bengal, LXVI., Pt. II., pp. 347–518 (1897).

Crotalaria Wightiana Grah. Ceylon; Kandy, *Thwaites; Watson*. Pedrotalla, *T. Thomson*. [*C. rubiginosa* Willd. in Flora of Ceylon, II., p. 11.]

Crotalaria Saltiana Andr. "This name is given as a synonym in F. B. I. It is, however, older than the name *C. striata* DC., which is more usually employed." "*Crotalaria Saltiana* . . . . never has any but obtuse leaflets, and in no instance is even the larger terminal leaflet more than 2·5 in. long."

Melilotus indica All. "This being the older name must be substituted for the name *M. parviflora*." [See Flora of Ceylon, II., p. 21.]

Indigofera constricta Trimen. [Further notes are given on this species.—*Ed.*]

Sesbania ægyptiaca Pers. var. *typica*. *Emerus* Burm. Fl. Zeyl. 93, t. 41.

Sesbania sericea DC.; *S. aculeata* var. *sericea* Benth., in Thw. Enum. 441: Bak., in Flor. Brit. Ind., II., 115; Trimen, Flor. Ceylon, II., 34. Colombo, Ferguson. "There is no doubt that this differs specifically in the points noted by Mr. Baker. The pods most resemble those of *S. cannabina*, the foliage that of *S. paludosa*. It has only been once collected in Ceylon, and may possibly be an introduced species." [See Flora of Ceylon, II., 34.]

Desmodium Cephalotes var. *congestum; D. congestum* Wall. Ceylon.

Desmodium triquetrum DC., subsp. *genuina*. Ceylon.

Mucuna gigantea DC. Ceylon, *Walker*.

Dioclea javanica Benth. ; *Dioclea Fergusonii* Thw. Enum. 412. Ceylon, *Ferguson* (*Thwaites* C. P. 3817). [*D. reflexa* Hk. f., in Flora of Ceylon, II., 68.]

Phaseolus sublobatus Roxb. var. *typica ; P. trinervius* Bak. in Flor. Brit. Ind., II., p. 203. Ceylon.

Vigna lutea A. Gray. Ceylon, *Thwaites.*

Flemingia semialata Roxb. adopted for *F. congesta* var. *semialata* Baker.

Pongamia glabra var. *xerocarpa.* Ceylon, *Thwaites* 1489.

Mezoneuron hymenocarpum W. & A. ; *Cæsalpinia Gleniei* Thw. Enum. 414 in part. Ceylon, *Thwaites* 3815 in part. [See Flora of Ceylon, II., p. 101.]

Cassia mimosoides var. *Wallichiana,* as described by Baker, is *Cassia Leschenaultiana* DC. Var. *auricoma* " should not be separated as more than a variety from *C. Leschenaultiana.*"

Cynometra ramiflora var. *mimosoides* Baker. Ceylon ; at Trincomalee, *Rottler* (part of Wall. Cat. 5816C). [See Flora of Ceylon, II., p. 112.]

Cynometra ramiflora var. *heterophylla* Thwaites, Enum. 97. Ceylon ; sea coast, *Walker.*

The paper should be consulted for information concerning the species of Leguminosæ cultivated in India.